MARINE REVIEW

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NAMED FOR STEEL AND WIRE MANAGERS.

Four leaders in affairs of the American Steel & Wire Co., John W. Gates, James J. Hill, Isaac L. Elwood and Wm. Edenborn, will have lake freighters of the 8,000-gros-ton kind named for them within the next few weeks. The vessels are the four steamers of 500 feet over all length that are building by the American Ship Building Co. (two at Lorain, O., and two at West Bay City, Mich.) for the American Steamship Co., an organization that is controlled by leading stock holders in the American Steel & Wire Co. These vessels are the largest ever put down in a lake ship yard. Eight thousand gross tons (2,240 pounds) means about 9,000 net tons (2,000 pounds) and this the new ships will carry on about 18½ feet draught. Their dimensions are 498 feet over all, 52 feet beam and 30 feet depth and they will be fitted with quadruple expansion engines and water tube boilers of Babcock & Wilcox type. The first of them, to be named John W. Gates and to be christened by Mrs. John W. Gates, will be launched at Lorain at 3 p. m. on Saturday, the 20th inst., and will be followed by the James J. Hill at the same place about three weeks later. The other two steamers, building at West Bay City, as well as the engines and boilers in both cases, are well along, and it is expected that all four of the vessels will be ready for service about April 15. The American Steamship Co. is also having built at the Cleveland works of the American Ship Building Co. two 3,000-ton steamers that are of Welland canal dimensions. Contracts for these six vessels were placed originally by Mr. A. B. Wolvin of Duluth, but afterward taken over by the American Steel & Wire interests, Mr. Wolvin remaining in charge of their construction and being engaged as manager of the ships.

The contract just closed by the Union Dry Dock Co. of Buffalo with Mr. J. L. Crosthwaite of that city, who represents the Atlantic Steamship Co., is for a Welland canal size vessel—3,000 tons capacity—similar to the steamer for which Mr. Crosthwaite placed a contract with the Craig Ship Building Co. of Toledo a couple of weeks ago. The boat to be built in Buffalo will be 258 by 40 by 18¼ feet and will cost about $170,000. Engines will be triple expansion, with cylinders of 20, 33 and 54 inches diameter, and 40 inches common stroke of piston. Steam will be provided by two boilers of 12½ feet diameter and 11½ feet length.

SHIPPING BILL ENDORSED.

At the annual meeting of the Marine Society of the City of New York, held a few days since, there was adopted a memorial to the senate and house of representatives urging the passage of the shipping subsidy bill for the following reasons:

"That American shipping in the foreign carrying trade carries but 9 per cent. of the exports and imports of the country, as against its former highest percentage of 85 per cent. of the country's foreign trade.

"That a merchant marine as a naval reserve has been demonstrated in both our civil and Spanish wars.

"That the vessels of a country, under its flag and carrying its mails, are an advertising medium for the sale of the products of the country in the markets of the world. The demand for surplus products of farm, workshops and mine is thereby increased.

"That $200,000,000 are annually paid by American citizens to foreign ship owners as freight and passage money.

"That this money goes out of the country in hard cash, the larger part of which should be retained for distribution to reward American labor.

"That 'in shipping all industries are united,' all trades being represented in the construction of the ship, as also in its maintenance and navigation.

"That it is essential that the country shall have ship building plants, artisans, engineers and sailors for its use, defense and safety in the event of war.

"That this bill is best calculated to promote the development and distribution of the products of American labor by the extension of the merchant marine of the United States and to establish thereby more intimate commercial intercourse with other countries."

DEATH OF R. P. FITZGERALD.

From Milwaukee comes announcement of the death of R. P. Fitzgerald, who was among the best known of lake vessel owners Mr. Fitzgerald was seventy-four years old. About 1860 Mr. Fitzgerald started a vessel agency and marine insurance business in Milwaukee. Soon after the close of the civil war he was joined in this business by J. B. Merrill, who became a partner. These gentlemen kept up their copartnership until about a year ago, when Mr. Merrill retired on account of poor health. The schooners which Mr. Fitzgerald has owned at different times were the Henry Hager, Red, White and Blue, Joseph B. Paige and Marengo, famous swift sailing craft in their time. The bark Parana also belonged to Mr. Fitzgerald. In the year 1878 Mr. Fitzgerald, in company with P. D. Armour and W. M. Egan, purchased the Ballentine fleet, which consisted of the steamers D. Ballentine and C. J. Kershaw and the schooner A. B. Moore, the latter afterwards called the Northwest. Shortly afterwards they purchased the steamer W. H. Barnum. He sold this fleet in 1888 and with the same gentlemen he built the steamers R. P. Fitzgerald, P. D. Armour, W. M. Egan and John Plankinton.

The Kingsford Foundry & Machine Works, Oswego, N. Y., are very busy in all departments, running 13 hours a day. They are barely able to keep up with orders for marine engines, centrifugal pumping machinery and marine boilers.

ELECTRIC WINK SIGNALS.

Capt. F. M. Howes of the Merchants' & Miners' Transportation Co., Baltimore, recently addressed a letter to the supervising inspector general of steam vessels on the subject of the "electric wink" as a signal for the use of steamers meeting at sea. Capt. Howes laid stress upon the fact that the whistle signal is insufficient, often causing confusion, and moreover can frequently be heard but a short distance. His plan is to have steamers provided with electric masthead lights and he expresses the belief that by switching these on and off it would be possible to wink a signal to an approaching steamer of intention to pass to starboard or by two winks to indicate intention to pass to port. He has used "wink" signals on his ship for two years past in meeting other ships of the Merchants' & Miners' line and he is positive that there would be ample time for the exchange of signals before any danger of collision would exist. Capt. Howes recently received the following reply to his letter to the supervising inspector general:

"I am in receipt of your letter and also your description of the electric wink signals practiced by yourself when meeting ships of the same line in which you are employed, instead of the whistle signals required by law. In reply would say that the board of supervising inspectors has no control over the signals used on the high seas, which are subject to the "International Rules of the Road at Sea," and which could not be modified or altered, except through an international conference. Your plan of signals is an ingenious one, but I fear that it will be many years before they will be legalized, if ever, and until so legalized their use is fraught with danger, for if a mistake should occur—and mistakes are always possible—and a collision should follow, the vessel using the unlawful 'electric wink' signals would be held by the courts prima facie responsible for all damages that might result; and even though no collision should occur, the use of such signals for passing instead of the whistle signals, even between vessels of the same line, inside the 'lines dividing the high seas from rivers, harbors and inland waters,' as defined on page 21, pamphlet copy pilot rules for Atlantic and Pacific coast inland waters, subjects the master or mate using them to suspension or revocation of license, and the vessel to a fine of $200, 'one-half to go to the informer as noted in section 4, page 20, pamphlet copy, pilot rules, and act of congress approved June 7, 1897."

IMPROVEMENT OF THE SUEZ CANAL.

Improvements of more or less importance are constantly being made on the Suez canal. The plans mapped out for the future provide for an immediate increase in the depth of the canal, so as to accommodate vessels having a draught of 27 feet 10 inches, instead of 25 feet 7 inches, which is the present limitation. It has been planned that the canal and its approaches shall eventually be deepened to 32 feet 9 inches, in order that vessels drawing 29 feet 6 inches may pass safely from sea to sea with a fair depth of water under their keels. Looking back a quarter of a century some wonderful improvements have certainly been made in the Suez. It is significant that this work began with the inauguration of English administration and has increased proportionately with the increase in the number of English directors from three to ten. The sidings where the largest ships may pass have been increased by the addition of nine and the width of the canal has been so increased as to allow most ships to pass in all parts. The introduction of electric light was also an important innovation, and these improvements have made it possible for vessels to pass through the canal in less than 17 hours.

QUESTIONS REGARDING ADMIRAL DEWEY.

Editor Marine Review:—What commission and what number did Admiral Dewey hold at the battle of Manila? Has the United States navy ever had more than one admiral at one time?

Sheboygan, Wis. A. W. BROWN.

[Admiral George Dewey, U. S. N., at the date of the battle of Manila, May 1, 1898, was number three on the list of commodores. There has never been in the United States navy but one incumbent in the grade of admiral at any one time.—Editor].

The steam yacht Elfrida, now building on the Harlem for Dr. Seward Webb, is expected to prove one of the most interesting craft of the year. She will be 141 feet over all, 113 feet on the water line, 18 feet beam and 7 feet draught. She will be completed by June 1 and is guaranteed to develop a speed of 16 knots an hour during a three-hour trial. The vessel is designed for service on Lake Champlain, and in order to get her through the canal locks provision has been made for removing the bow and stern. These will be refitted when the lake is reached. The vessel will be fitted with two triple expansion engines to which steam will be supplied by water tube boilers. The propeller wheels will be of bronze and the yacht will have two composition surface condensers and a fan blower.

The Canadian government has adopted for use at Vancouver, B. C., an improvement in fog-signalling and light-house apparatus which is a combination of the principle of the electrically vibrated phonographic diaphragm, with two large megaphones from which signals are sounded alternately. In connection with the siren signals a light flashes every forty seconds, the siren signals being sounded for the remaining twenty seconds of the minute. The mechanism is regulated by clockwork.

RESISTANCE OF SHIPS.

BY WM. A. FAIRBURN.

The editor of the Marine Review submits to me from Mr. B. L. Smith of the Institute of Naval Architects, London, a communication referring to my article in the Review of Nov. 9, 1899, on the "Admiralty Co-efficient with Some Facts Gleaned from Torpedo Boat Steam Trials." Mr. Smith says: "If the writer of this article will be kind enough to answer a few questions, it will give me and others the means of judging the value of his conclusions. Suppose we have three ships—200 feet long, 400 feet long, 800 feet long; their beams one-tenth of their length their draught 6 feet, 12 feet and 24 feet, respectively. What speed would the 800-foot vessel go without wave resistance? Would the rate of speed be increased by reducing the beam and to what extent? What would be the most economical rates for the vessel, 3,000 or 6,000 miles voyages? What would be the best beam? Would the other ships be a guide and to what extent? Any other information that Mr. Fairburn may furnish will be gladly accepted."

My article on the "Admiralty Co-efficient" was not intended to be a general treatise on the resistance and powering of ships. The first three lines of the final paragraph of the article, which I will here quote: "It follows, therefore, that the larger the boat the higher will be the admiralty co-efficient, provided the rising speed is not reached, but if this speed be exceeded, the larger the boat the smaller will be this co-efficient," can be considered the conclusions reached in the article under question. I do

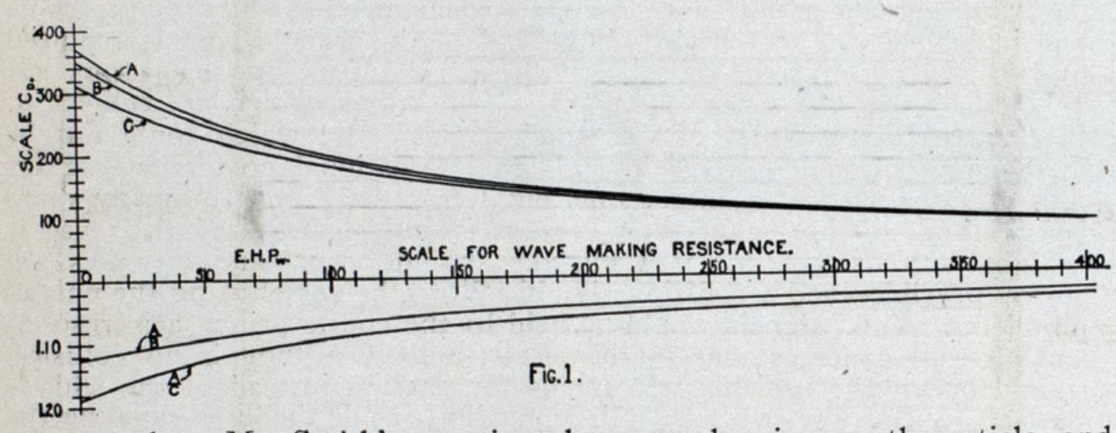


Fig. 1.

not see how Mr. Smith's questions have any bearing on the article, and I also fail to see how any answers which I may make to the questions asked should influence anyone in accepting the conclusions reached in the article before mentioned. I do not intend to enter into a newspaper controversy over this matter, but I will reply to Mr. Smith's questions out of courtesy to the writer and the institution in whose rooms the letter was penned.

The length, beam and draught of three vessels which we will term a, b, and c, are stated:

	a	b	c
Length	200 feet	400 feet	800 feet
Beam	20 feet	40 feet	80 feet
Draft	6 feet	12 feet	24 feet

We will assume a block co-efficient of .5, which will give a displacement of 340 tons for vessel "a." The wetted surface of the same vessel will be 4,100 square feet. As the wetted surface varies as the square of the ratio of the linear dimensions and the displacement as the cube of the same, the following figures are easily determined for the three visionary vessels:

	a	b	c
Displacement	340 tons	2,720 tons	21,760 tons
Wetted surface	4,100 sq ft	16,400 sq ft	65,600 sq ft

Replying to the first question, "What speed would the 800-foot vessel go without wave resistance"? will say that wave making resistance is a part of the total resistance of any ship at the lowest speeds. The amount of this wave making resistance increases with the fullness and speed of the ship. Although at low speeds it is very small and can at times be almost neglected, nevertheless it exists and should be considered when a vessel is powered from the known performance of a similar vessel. A gunboat 226 feet long at a speed of about 7 knots per hour has wave making resistance equal to 17 per cent. of the total resistance. The same ratio exists in the case of a smaller, faster gunboat 190 feet long at a speed of 8 knots per hour. The former vessel at a speed of 10 knots and the latter at a speed of 10½ knots experiences wave making resistance equal to 25 per cent. of the total resistance. Vessels of this class as a rule at a speed, $V=\sqrt{L}$ when L=length on the water line, have wave making resistance equal to the skin frictional resistance or 50 per cent. of the total resistance. At any speed that would make any proposed or built ship today a commercial success, wave making resistance would be in evidence and to such an extent that it would demand consideration.

Replying to the second question, "Would the rate of speed be increased by reducing the beam, and to what extent"? will say that a reduction of beam would decrease the wave making resistance at any speed and raise the speed at which wave making resistance becomes particularly noticeable, assuming, of course, that the block co-efficient and character of lines remain the same, and if a constant displacement is desired it is obtained by increasing the draught. If we assume that all the resistance is due to surface friction or that wave making resistance is only a very small percentage of the total resistance, then it is obvious that any change of dimensions that will decrease wetted surface without increasing wave making resistance will decrease the E. H. P. necessary to overcome the resistance of the ship. If the length, draught and block co-efficient remains the same, any decrease of beam will lessen the amount of wetted surface and accordingly decrease the resistance of the ship and the power to overcome the same.

Continuing this subject and replying to the third question, "What would be the most economical ratio for the vessel, 3,000 to 6,000 mile voyages, and what would be the best beam"? will say that with a stated length, co-efficient of fineness and displacement, the question of determining the best beam is a very complicated and difficult matter. Draught of water is quite often limited, and stability and strength have usually much more to do with the determination of the beam of a vessel than propulsive efficiency. We will assume, however, that the latter is all important, the influence of the former qualities being neglected; also that the vessel is large and of very low speed, the wave making resistance being so small that it can be neglected. Under such conditions the best beam is the one that gives minimum wetted surface on any stated length, block co-efficient and displacement, the draught being the second variable. Let us consider a case first of maximum beam, the draught being reduced to a minimum of say 1 foot. The length, co-efficient of fineness and displacement being constant, the wetted surface would be increased from 65,600 square feet (see table vessel "c") to about 1,142,400 square feet. Let us now consider a case of minimum beam of say 1 foot with maximum draught. Here the wetted surface would be still further increased to about 2,985,500 square feet. If the water lines and cross sections of the vessel were rectangles, the block co-efficient being 1·0, minimum wetted surface would be obtained with a beam of 61.968 feet and a draught of 30.984 feet, or a ratio beam do draught of 2 to 1. If the water lines were rectangles and the sections triangles or areas bounded by arcs, minimum wetted surface for a constant displacement would occur where the beam of the vessel is equal to twice the draught. As the water lines of a vessel are not rectangles, but areas bounded by curved lines, the fullness of which depends on the block co-efficient, we can determine the dimensions to give minimum wetted surface on a stated length, co-efficient of fineness and displacement with a close degree of accuracy, by making the mean width of the water line equal to twice the draught. If the co-efficient of fineness of the load water plane is ·75, the ratio of beam to draught is 2·66. If Cw= ·8, ratio B to d=2·50. When Cw= ·9 ratio B to d=2·22. If economy of propulsion should be the only quality worthy of consideration when determining the most suitable dimensions for a modern cargo steamship 800 feet long, then the draught of such a vessel 32·5 feet, the maximum of today, would give the vessel a beam of 72 to 73 feet.

The last question, "Would the other ships be a guide and to what extent"? referring to powering vessel "c" from the known performances of vessels "a" and "b," is probably intended to show the fallacy of the admiralty co-efficient method of powering similar ships when of low speed. But the imperfections of the co-efficients C_D and C_A were explained at length in some cases, and in others briefly mentioned in the article relative to the admiralty co-efficient and the rising speed, and none

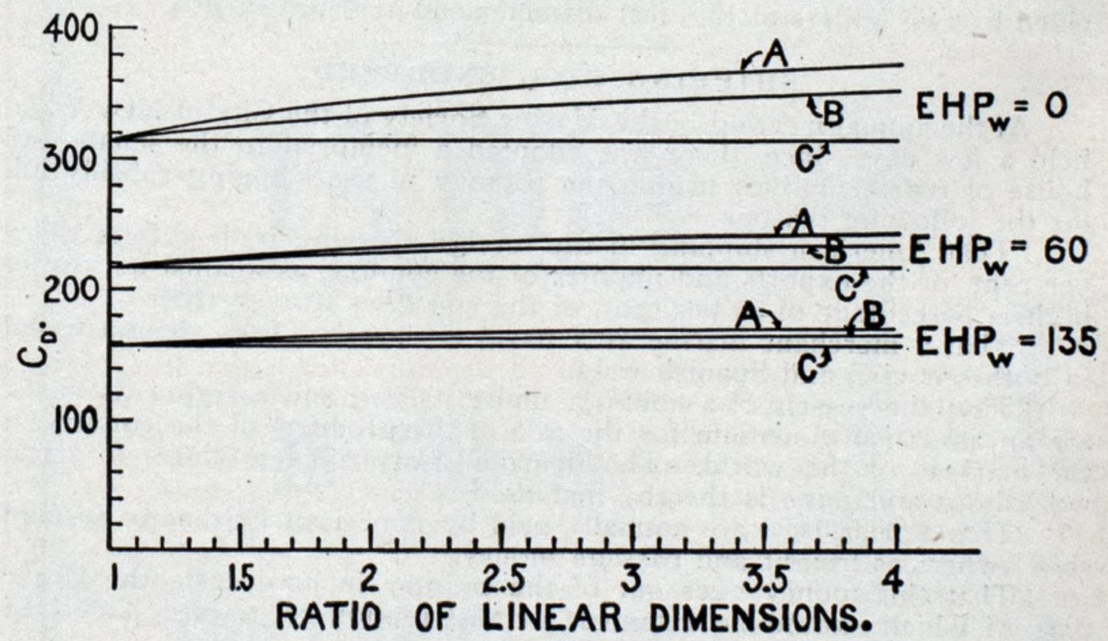


Fig. 2.

of these imperfections seriously affect the conclusions stated in the article in question. If the resistance of a ship is composed wholly of that due to surface friction, then it is a simple matter to estimate the E. H. P. necessary to overcome this resistance. $R_f = C.\ S.\ V^{1.83}$. Where R_f= resistance in pounds due to friction, C is a co-efficient of friction. S is the area of wetted surface in square feet and V is speed in knots. Now a resistance of one pound at a speed of one knot absorbs .0,030,707 H. P. (Taylor); then E. H. P.=.0,030,707 V. $R_f = C \times S \times .0{,}030{,}707\ V^{2.83}$. The co-efficient of friction C varies with the extent and nature of the surface. A vessel 200 feet long with a steel, clean, well-painted bottom will have a co-efficient of friction of .00945. A 400-foot vessel will have a co-efficient of .00910, and an 800-foot vessel will have a co-efficient of about .00895. At a speed of 12 knots per hour the power, E. H. P_f, to overcome the frictional resistance of these vessels, a, b and c, would be 135 H. P., 519 H. P. and 2,042 H. P. respectively. The ratio is as 1:3.85:15.12. If the co-efficient of friction is constant the ratio would be as 1:4:16. The corresponding speeds of these vessels would be in the ratio of the square root of the ratio of the linear dimensions, or as 1:1.414:2. Therefore if 135 H. P. is required to overcome the resistance of vessel "a" at 12 knots, vessel "b" at the corresponding speed of 16.968 knots will require 1,383 H. P. and vessel "c" at the corresponding speed of 24 knots will require 14,520 H. P. Suppose the trials of vessel "a" proved that at a speed of 6 knots per hour the frictional resistance was 98 per cent. of the total resistance experienced by the vessel. The E. H. P. required to overcome this R_f would be 18.94 H. P. and the total E. H. P. required to overcome. $R_f + R_w$ would be 19.33 H. P., R_w being 21.17 pounds and E. H. P_w, being .39 H. P. This small amount of wave making resistance would require 50 E. H. P. to overcome it when vessel "c" is propelled at her corresponding speed of 12 knots. When the resistance of a ship is composed wholly of frictional resistance, the admiralty co-efficient cannot be accurately applied at corresponding speeds, and the larger the ratio of linear dimensions the greater will the discrepancy be. Vessel "a"

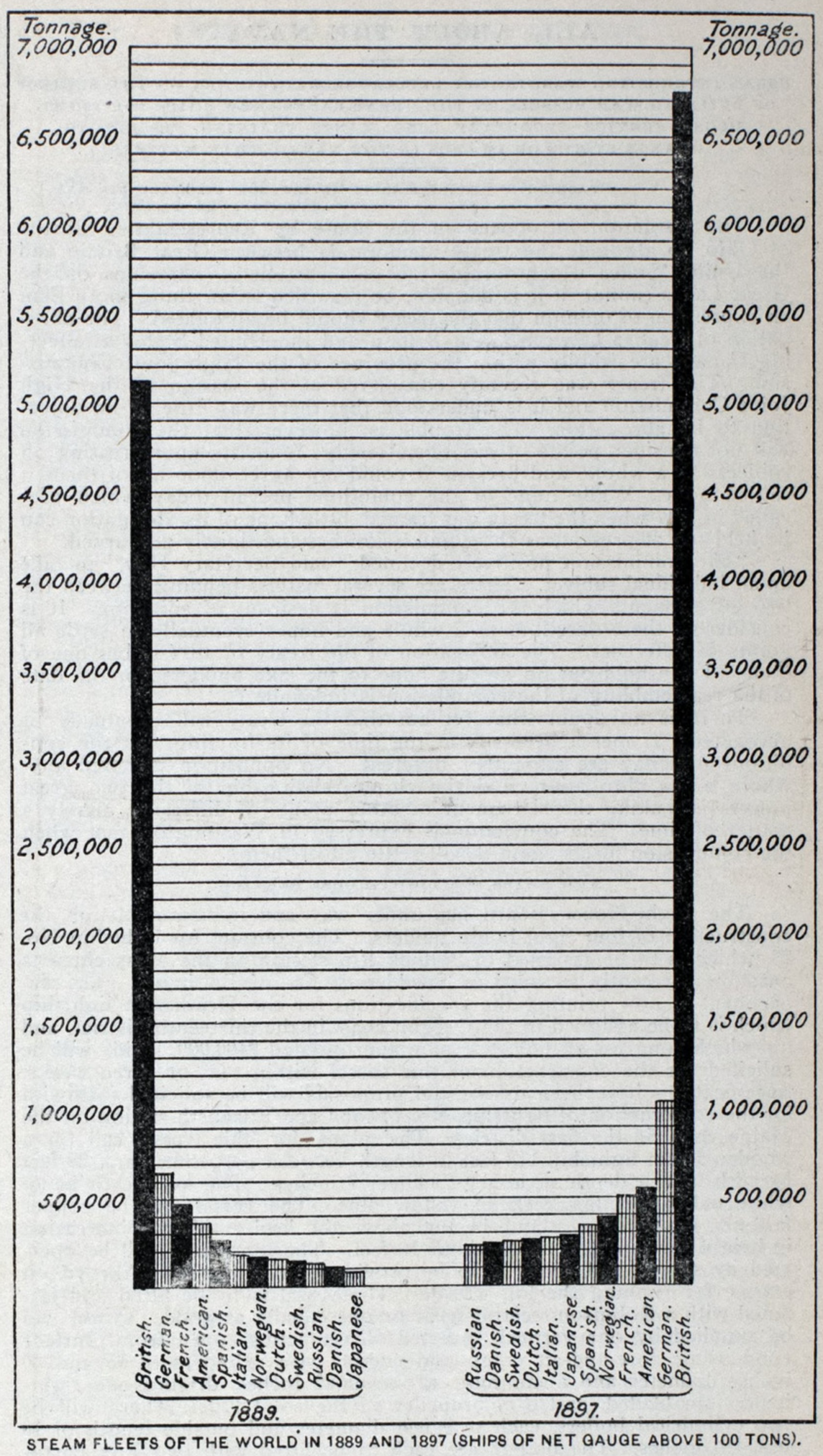
at 6 knots speed has an admiralty co-efficient of 272, assuming that the propulsive co-efficient is .5 or that I. H. P.=2 E. H. P. Vessel "c" at the corresponding speed of 12 knots has a C_D of 322, or if a constant co-efficient of friction is used, 305. If the resistance of a vessel consists of skin frictional resistance only, then the admiralty co-efficient $\frac{D^{\frac{2}{3}} \times Vn}{P} = C_D$ would be applicable at all speeds for any sized vessel, if the co-efficient of friction remained the same and if the speed exponent n had the value 2.83 instead of the usual value 3; assuming, of course, that the propulsive co-efficient or the relative of the effective to the indicated horse power remains constant.

Fig. 1 has been prepared to show the amount of the discrepancy when a very large vessel is powered by means of the admiralty co-efficient from the performance of a small vessel. We take here a very exaggerated case, the large vessel "c" having 64 times the displacement of the small vessel "a." No experienced naval architect would ever think of powering vessel "c" from the performance of vessel "a" without separating frictional resistance from the total resistance of the vessel, especially if the speed is low and the wave making resistance is but a small part of the total resistance of the vessel. The only accurate way to power any ship is to calculate the frictional resistance and apply Froude's law for determining the wave making resistance from an experiment made with a model in an experimental tank or from tests made on a vessel of similar shape. Nevertheless, the admiralty co-efficient gives a close approximation to the power required when judiciously used, and although imperfect, it is, in the hands of a competent naval architect, of great value. In fig. 1 the upper portion of the diagram has values of C_D for ordinates and the E. H. P. necessary to overcome wave making resistance on the 200 foot boat known as "a" for abscissae. The curve C shows the value of C_D at a speed of 12 knots for vessel "a," with a varying amount of wave making resistance. Curve A gives the value of C_D for vessel "c" at the corresponding speed of 24 knots, and curve B shows the value of C_D for the same vessel if a constant instead of varying co-efficient of friction is used. The two curves in the lower part of the diagram show the difference between curves A, B and C on a large scale and they are self-explanatory. It will be seen that as the amount of wave making resistance increases the admiralty co-efficient becomes more accurate and reliable.

Fig. 2 is intended to show that the discrepancy involved by the use of the admiralty co-efficient in powering similar vessels increases as the ratio of linear dimensions is increased, as well as decreases as the amount of wave making resistance increases. The diagram explains itself, curve A being the curve of admiralty co-efficients C_D at corresponding speeds, all based on vessel "a" at a speed of 12 knots. Curve B assumes a constant instead of a varying co-efficient of friction. C is a horizontal line parallel to the base. Let us, in conclusion, see what the error would be by powering a 300-foot boat by the admiralty co-efficient method from the performance of the 200-foot boat "a." The 300-foot vessel we will term "d."

	"a"	"d"
Length	200 feet	300 feet
Beam	20 feet	30 feet
Draught	6 feet	9 feet
Wetted surface	4,100 sq ft	9,225 sq ft
Displacement	340 tons	1,160 tons
Speed (corresponding)	12 knots	14.7 knots
E. H. P.	135	529

If the propulsive co-efficient is .5 and all the resistance is due to skin friction, the value of C_D of the vessel "a" is 312, and the value for vessel "d" is 331; if a constant co-efficient of friction is used the latter value is reduced to 324, the E. H. Pf being 540 instead of 529. If vessel "a" at a speed of 12 knots experiences wave making resistance that requires 60 E. H. P. to overcome it, the resistance being 1,628 pounds, the value of C_D would be 216 and this value of C_D for vessel "d" at a corresponding speed of 14.7 knots would be 225, or if constant co-efficient of friction is used 222. If the wave making resistance of vessel "a" at 12 knots speed is 3,663 pounds, the E. H. Pw would be 135 and the value C_D would decrease to 156. Vessel "d" at the corresponding speed would require 558 E. H. P. to overcome wave making resistance, and the value of C_D would be 161 if a variable and 159 if a constant co-efficient of friction is used. The rising speed of vessel "a" is 23.78 knots; "d" is 29.18 knots, "b" is 33.63 knots and "c" is 47.56 knots. As the rising speed has as yet been reached by only high speed torpedo boats and fast launches, it follows that at such a speed wave making resistance must be very prominent. The law seems sure, and although the co-efficient 9 may have to be modified somewhat in the formula $V=9\sqrt[6]{D}$, yet the position of the rising speed and its influence are of great interest, and if the position can be approximated to at this time, the result cannot fail to prove of value. These remarks will, I trust, answer the questions asked and prove of interest in a general way to many readers of the Marine Review.



STEAM FLEETS OF THE WORLD IN 1889 AND 1897 (SHIPS OF NET GAUGE ABOVE 100 TONS).

ARMOR PLANT AT NEWPORT NEWS.

It is again reported that an armor plate factory will ere long be established in connection with the plant of the Newport News Ship Building & Dry Dock Co. at Newport News, Va. Indeed it is stated that consideration of this project was the main object of the recent visit of Mr. Collis P. Huntington to Newport News. A bill has been introduced in the Virginia legislature authorizing the Newport News company to issue preferred as well as common stock and to make such changes in its affairs as would indicate the establishment of an armor plate factory. The conjecture is that the new works will be located on the twelve acres of land adjoining the ship yard, which Mr. Huntington purchased last year for $100,000. It is understood to be Mr. Huntington's purpose to build up a works where battleships may be turned out complete, as is the case at several of the principal British ship building yards.

A report comes from Baltimore to the effect that in all probability a new company will be organized to take over the plant of the defunct Columbian Iron Works Co., and inaugurate steel ship building on a larger scale than ever.

DELAY IN WARSHIP CONSTRUCTION.

The naval board of construction at a meeting held a few days since, decided to grant an extension of twelve months over the contract period for the completion of torpedo boats and torpedo boat destroyers now building. This action was based on a petition from seven firms representing twenty-two vessels, in which it was said that the manufacturers of steel could not furnish the necessary material in time to enable the firms to complete the boats within the contract limitation of time. Investigation by the board of construction showed that this statement was correct. All steel makers are working overtime, and even under these conditions will find it extremely difficult to fill existing contracts. Only two firms are in a position to manufacture the required bulkhead armor and these have on hand private contracts which will keep them busy for many months to come. The thin-rolled steel required for the construction of destroyers and torpedo boats cannot be readily obtained, as the steel makers claim they make little profit on this class of work and will not therefore furnish this material unless in cases where they are forced to do so, in advance of other orders.

The Columbian Iron Works, Baltimore, which is engaged in the construction of the torpedo boat Tingay and the submarine boat Plunger, has formally notified the department that its affairs are in the hands of a receiver and has submitted an application for an extension of time allowed for the construction of the torpedo boat. The application was made in order that the receiver might be in a position to inform the court of the government's willingness to have its work continue to completion, and the naval construction board decided to give the company an extension of eleven months.

The United States torpedo boat Goldsborough, recently completed by the Wolff & Zwicker Iron Works, Portland, Oregon, was recently subjected to a second builder's trial. The machinery worked perfectly and during a portion of the run the vessel steamed at the rate of 32 miles an hour against a two-mile current.

ALL ABOUT THE NAVY.

USUAL INTERESTING WASHINGTON LETTER—SECRETARY HAY ON THE SUBJECT OF BUILDING WAR VESSELS ON THE GREAT LAKES—NEW SHIPS FOR LIGHT-HOUSE SERVICE—SECRETARY LONG WANTS TRAINING VESSELS—TO CHANGE SYSTEM OF AWARDS IN THE NAVY—OTHER MATTERS.

WASHINGTON OFFICE MARINE REVIEW, 1345 PENNSYLVANIA AVE.
WASHINGTON, Jan. 10, 1900.

The resolution introduced in the house by Representative Burton of Ohio, to abrogate the treaty memoranda between Great Britain and the United States which forbids the construction of war ships on the Great Lakes cannot, if it is adopted, be regarded as anything more than an expression of opinion that the treaty should be abrogated. The abrogation of treaties between Great Britain and the United States as affecting Canada are wholly within the province of the High Joint Commission. The treaty was recently considered at the session of the High Joint Commission and it is understood that there was little or no objection to its abrogation. The trouble is, however, that the commission will not consider points of difference singly; it insists upon treating all subjects as a whole, and because it could not agree upon all of them it settled none. While none of the conditions prevail today which prevailed in 1817 when the treaty was framed, little hope of its abrogation can be held out at present, as the commission has indefinitely adjourned.

"The commission positively declined," said Secretary Hay," to take up an individual subject. There are several matters pending between the two governments which the commission is desirous of adjusting. It is considering these questions as a whole and hopes eventually to settle all points of difference. The abrogation of the treaty of 1817 is but one of them. I can hold out no definite hope to the lake builders, for the date of the reassembling of the commission is indefinite."

There is no doubt whatever but that the treaty will eventually be abrogated. It met a necessity at the time of its framing, but the conditions of today are altogether different. No opposition is noted anywhere to its abrogation, and the closer relationship of the two great powers is making the settlement of other points of difference merely a matter of time. The conviction is expressed in Washington that when the commission meets again it will settle all of them.

NEW SHIPS FOR LIGHT-HOUSE SERVICE.

The Light-House Board has under way and in contemplation the construction of four light-house tenders. The contract for lightship No. 73, which is to be assigned to Pollock Rip station on the Massachusetts coast, was recently awarded to Spedden & Co. of Baltimore. The department is now printing the specifications for the Heather, a lightship which is to be assigned to the Oregon coast in the thirteenth district, and for which congress at its last session appropriated $100,000. Bids will be solicited for the construction of this vessel within two or three weeks. Specifications have been drawn and proposals will be solicited forthwith for the construction of lightship No. 74 for Cape Elizabeth station on the Maine coast in the first district. The plans for this vessel call for a wooden steam lightship 118 feet in length between perpendiculars, 28 feet breadth, and a depth of hold of 14 feet 7 inches. The keel is to be of white oak and bilge keels of yellow pine. The vessel will be copper fastened up to a line about 14 feet above the keel amidships increasing in height forward and aft to about 16 feet. The fog signal will be operated by steam, and room is to be provided for a Hornsby-Akroyd oil engine for running the fog whistle. The vessel is to be fitted and fastened with a Robinson steering gear or one equally as good. Power will be supplied by one vertical, inverted, direct acting, open front, surface condensing, fore-and-aft compound engine with cylinders of 15 and 30 inches diameter and a common stroke of 22 inches, driving one right-hand, four-bladed, cast-iron propeller of the solid type. There will be two cylindrical boilers, each of 9 feet diameter and outside length of 16 feet 4½ inches. The boilers are each to be fitted with two Fox corrugated furnaces.

A letter has been addressed to the inspector of the ninth light-house district (Lake Michigan with headquarters at Chicago) asking him what kind of light-house tender is best adapted to his uses. Congress at its last session appropriated $85,000 for this vessel. The engineer's department of the light-house board has already started on the plans of engine and boilers for this ship, but beyond that they cannot go until they hear from the inspector. It is not definitely known whether this vessel will be constructed during the present year or not, though an effort may be made to have her completed sometime in the fall. It will be impossible to construct her within the appropriation, considering the present price of steel, and this is thought to be the cause for delay. It has been decided to call the light-house tender for the great lakes the Sumac.

SECRETARY LONG WANTS TRAINING VESSELS.

Secretary Long recognizes the fact that the navy is deficient in adequate training ships and has recommended to congress provision for two sailing vessels to possess auxiliary steam power. In his letter on this subject the secretary says: "The seafaring class of the population of the United States is very small, and in order that the navy may be properly recruited it is necessary that the men who are enlisted as landsmen be given suitable preliminary training before they are sent on cruising vessels. The only practical way of properly training these landsmen, and apprentices as well, is by putting them on vessels adapted for this purpose, in company with regular crews of the navy, and the best kind of vessel for this use is one of full sailing power and auxiliary steam power. Of the ships now in the navy that might be used this way the Hartford, recently fitted out at Mare island, and the Lancaster, now cruising in the West Indies, are particularly good. The Dixie, recently fitted out at League island, though the best available vessel for this purpose on the coast, is a conversion from the merchant marine. The Alliance, one of the apprentice training ships, after making a five months' cruise, has been laid up for six weeks' repairs, which will only permit her to continue in service about four months longer, after which time extensive repairs will be necessary. The Adams, Mohican and Essex are the only other vessels now available for the apprentice training service, and these, like the Alliance, cannot be expected to hold out much longer. It is thus seen that the number of vessels which might be advantageously used for training purposes is small, and that the vessels themselves are old and not likely to be serviceable much longer. The number of enlisted men in the navy will be larger than it has been in the past and the necessity of keeping the full complement of vessels in efficient condition at all times will be much greater than before. The department therefore recommends as a matter of importance to the efficiency of the personnel of the service that authority be given for the construction of two composite-built sailing ships, full rigged and with auxiliary steam power, each capable of carrying 500 enlisted persons, including the ship's company proper and those under training. A vessel of this size is much more economical for the purpose contemplated than smaller vessels would be, and the interest of the government would be greatly subserved by the construction of the two vessels herein recommended."

TO CHANGE SYSTEM OF AWARDS IN THE NAVY.

The senate and house committees on naval affairs have just received the following joint note from Secretary Long: "The department has the honor to suggest that the present system of rewarding officers of the navy and marine corps for eminent and conspicuous conduct in battle and extraordinary heroism, under the provisions respectively of sections 1506 and 1605 of the revised statutes, has been found to be unsatisfactory, since in its practical application it operates unjustly, and in some instances defeats the purpose for which it was devised. At the present time some officers who rendered distinguished services during the war with Spain have in recognition thereof been advanced upon the list; others remain without reward of any kind; while others still, by the curious operation of the existing system, find themselves in lower relative positions than they occupied before the war of 1898, in which they so gallantly participated. An illustration of objectionable operation of the present methods of rewards is afforded by the case of Capt. Charles E. Clark, U. S. N., who commanded the Oregon during the memorable run of that vessel from the Pacific to Atlantic waters and at the battle of Santiago, and yet, owing to the promotion over him of Captains Gridley, Coghlan and Dyer for their eminent and conspicuous conduct in the battle of Manila bay, is today two numbers, and if Capt. Gridley had survived, would be three numbers lower on the list than if the war had never occurred. The vigilance, prudence and capacity, unremitting and sustained, wisely meeting as they successively arise the countless details of the management of a battleship, establishing and maintaining the moral essential to good work, and bringing the vessel into effective action at a critical time are qualities which entitle an officer to share in rewards, if any are given, for distinguished naval service. These qualities were exhibited in a high degree by the officers participating in the battle of Manila, who have been rewarded by advancement on the navy list. They were also exhibited by other officers, particularly those who had so conspicuously and meritoriously participated in the battle of Santiago and yet have not in any way been rewarded."

The secretary suggests that two bills introduced in the last congress be passed at this session. One of these substitutes medals and increased pay in place of the present system of rewarding officers by promotion or numerical advancement. The other bill, which was reintroduced at the present session and has already passed the senate, provides for restoration to their former places in their respective grades of officers who were jumped by the officers advanced for service at Manila bay. This bill is designed to do justice to Capt. Clark of the Oregon.

INSPECTION TESTS OF THE HOLLAND.

Inspection tests of the Holland submarine boat will be given as soon as the Potomac clears of ice. As the weather is steadily improving, the tests will probably be given next week. Mr. C. E. Creecy, Washington representative of the Holland Submarine Boat Co., says that on her recent trial the Holland met all the requirements of the navy department which were as follows: The ability of the Holland to run awash at good speed; ability to dive and rise readily and with certainty; ability to run under water at depths from 10 to 35 feet at a speed of about 6 knots per hour, holding a reasonably steady course, both in the vertical and horizontal planes during said runs of not less than ten minutes in deviation; to turn both to starboard and to port with reasonable quickness and certainty, managing the steering gear without too much effort and conveying readily and with certainty the movements of the steering wheel to the rudder; efficient and satisfactory mechanism for controlling the diving apparatus; efficiency and certainty of the mechanism in its action for raising and lowering the boat in the water and for altering her trim; a reasonably simple apparatus as well as certain and efficient in its action for insuring a steady course during the run, both above and below water; strong construction of the boat, the material and workmanship of all parts the best of their kind; efficiency of the torpedo discharge apparatus by one or more discharges of torpedoes adapted to each kind of tube mounted on board, and their explosion with certainty at the proper time; discharging successfully and efficiently, through the tube provided for the purpose, of Whitehead torpedoes furnished by the department; means of supplying air inside during the whole time that she may be used to effect a submarine operation in war.

The government has taken no further steps as yet to secure possession of the patents.

It is quite probable that it will be necessary to send officers from Washington to take the Wisconsin out on her trial trip. So excessive have been the demands upon the officers on the Pacific coast that few are available for extra duty. In this connection the failure of congress to provide funds for the dredging work necessary at the Mare island navy yard has further embarrassed the officials. The Wisconsin cannot be brought up to the yard, but must be taken to Puget sound for docking and for completing the work on the ship usually done at a government plant. It was estimated that it would cost $100,000 to do the work of dredging, but congress never appropriated the sum. It will take a great deal of money to transport men and material to a distant ship and ship yard. Thus in the case of the Wisconsin the workmen and the material

must be carried from Mare island to Puget sound, as was done when the Oregon received her bilge keels. The largest ships of the navy on the Pacific coast will not be able to reach the Mare island yard until the approach is dredged.

The naval station at Yerba Buena, Cal., has been completed. The report on the machinery and other equipment of the place has been received at the navy department and the station will be formally transferred to the government by the contractors soon. This station resembles in equipment the training station for apprentices at Newport, R. I., and will be the headquarters of the Pacific apprentice service, just as the institution at Norfolk is the headquarters for the Atlantic service.

TRIALS OF THE CRUISER ALBANY.

The United States cruiser Albany, formerly the Brazilian cruiser Admiral Abrouall, purchased by the United States government shortly before the beginning of the war with Spain, while under construction at Newcastle-on-Tyne, England, was given a successful official trial off Newcastle on Tuesday last. She developed a speed of 20.87 knots, showed thorough seaworthiness, and exceeded her contract conditions. The trial was under the supervision of a United States naval board, consisting of Lieut. Commander Colwell, the United States naval attache; Chief Engineer Norton, and Constructor Gilmore. Once out in the North Sea, the Albany began to tune up. Four times she steamed past the measured mile, running under natural draft at a mean speed of 19.6 knots, which was .6 above contract speed. Then came the crucial test. Forced draft was brought to bear against the tide and wind. The Albany, which had previously not made any fuss, began to throw up seas from her ram to the bridge, but she cleared the waves as steadily as possible until she reached a speed of 20.87 knots. Her mean speed over the four measured miles, under forced draft was 20.50. Her contract speed was 20 knots.

Lieut. Commander Colwell, in speaking of the trial, said: "I am delighted with the ship. She is one of our fastest cruisers, and comes up to all the requirements." Engineer Norton declared the engines worked like clockwork, and without a hitch.

The guns will be on board the new cruiser, ready for her American crew, in six weeks. She still has to undergo her endurance trial of six hours at 19 knots, natural draft. The Armstrongs claim that these tests show the Albany is the equal of any vessel of her class afloat. Running up the Tyne the cruiser flashed her new Cowper-Coles searchlights, experimenting for the first time with metallic instead of glass reflectors. The results were satisfactory.

The Albany is a sister ship of the New Orleans, formerly the Brazilian cruiser Amazonas. She was launched at Newcastle, Jan. 14, 1899. She has a displacement of 3,600 tons, and her engines have an indicated horse power of 7,500 under natural draft, which is expected to give her a speed of more than 20 knots. She is 330 feet over all, with a molded breadth of 43 feet 9 inches, and a maximum draught of 16 feet 10 inches. The new cruiser is schooner-rigged, has fighting tops on both masts, and a signal-yard on the foremast above the military top. Her two funnels are placed amidships, and she is fitted with tubular boilers. The engines are of the triple-expansion, direct action type, each capable of generating an indicated horse power of 3,750. Her coal capacity is 850 tons, giving a steaming radius of 8,000 knots, sufficient to enable her to cross and recross the Atlantic.

The armament is arranged similarly to that of the Cincinnati, and consists of six 6-inch rapid-fire and four 4.7-inch rapid-fire guns in the main battery. These are placed forward and aft on the main deck. The secondary battery consists of ten 6-pounders, four 1-pounders, and four Maxim rapid-fire guns. All the guns are of the latest type of rapid-fire rifles. The cruiser is also fitted with three submerged torpedo outfits. She has no armor, in the ordinary sense, but her machinery is protected by an arched steel deck just below the waterline, varying in thickness from 1.2 to 3.5 inches, and the guns are protected over their positions by armor 4½ inches thick. The Albany was built from Brazilian specifications, which the United States government approved when she was purchased. American naval experts subsequently introduced a few American ideas which were developed during the war.

NO ACTION ON HOLLAND BOAT.

The United States navy department has as yet taken no action relative to the adoption of the Holland submarine torpedo boat, although reports of the naval board of inspection which witnessed the tests at Peconic bay have been on file for some time and have been under consideration by the board of construction. The Holland is now ice bound in the Potomac river at Washington and thus the exhibition tests before members of congress will in all probability of necessity be postponed until warmer weather. The business difficulties encountered by the Columbian Iron Works, Baltimore, will be likely to still further retard the completion of the submarine torpedo boat Plunger, also of Holland type, which is building there for the government. Congress has authorized the navy department to purchase two submarine vessels of the type of the Holland, and the Electric Boat Co. is now endeavoring to have the department either purchase the Holland or give a contract for the construction of two new vessels of her general design.

ARGONAUT NEARING COMPLETION.

Simon Lake's submarine boat, the Argonaut, which has been undergoing a rebuild at Bridgeport, Conn., is all but completed, and preliminary tests are said to have given very satisfactory results. The Argonaut was submerged a few days ago and was found to be airtight. Even after the hatches had been battened down, there were several small repairs to be made on the machinery and still others will be necessary before the boat can be submerged in deep water, which will probably be some two weeks hence. During the trial mentioned the vessel remained submerged for an hour and no air escaped from it, nor did any water enter. The ballast was also found to be satisfactory. The final test by a submergence in deep water will be made off Bridgeport light-house.

ARMOR PLATE MANUFACTURE.

BRIEF HISTORY OF THE DEVELOPMENT OF THE INDUSTRY AND THE EXPERIENCE OF THE GOVERNMENT WITH THE MANUFACTURERS.

The controversy which has been in progress during the past two sessions of congress relative to prices to be paid for armor for United States naval vessels and the rumors of late regarding the establishment of an armor plant in connection with the ship yard at Newport News have naturally aroused general interest in the armor question. The first contract for armor plate awarded by the United States navy department was for material of this kind for the battleships Maine and Texas and the monitors Puritan, Amphitrite, Monadnock and Terror, and was given to the Bethlehem Iron Co. in June 1887. The amount was 6,700 tons and the average price $536 per ton. Originally it was agreed that this armor should be plain steel, oil-tempered and annealed, but later the introduction of nickel into steel was specified and still later the Harvey process was adopted. In 1890 and 1893 there were contracts with Carnegie, Phipps & Co., and further contracts with the Bethlehem Iron Co. In 1897 the dissatisfaction of congress owing to the prices being asked for armor plate manifested itself in an authorization to the secretary of the navy to inquire into the cost of manufacture. Not unnaturally the manufacturing companies did not manifest a desire to disclose any considerable amount of data relative to the cost of manufacture. Secretary Herbert, utilizing such information as he could procure, estimated that $400 per ton would be a fair price to be paid for armor for the battleships Alabama, Illinois and Wisconsin, for which bids were soon to be invited.

With various estimates before it, congress on March 3, 1897, established an arbitrary price of $300 per ton to be paid for armor. The armor manufacturers protested vigorously. In order to show approximately what this price meant, they assumed that for three years there were manufactured 2,000 tons of armor per year, which was about the average quantity, and which at the price of $300 per ton would yield the gross sum of $1,800,000 or $600,000 per year. The cost of a plant with a fair allowance for working capital would amount to about $4,000,000. It was argued, therefore, that if the armor should cost nothing to make, the gross receipts per year would be only 15 per cent on the capital invested in a plant which might in a few years become worthless. They further argued that foreign governments are compelled to pay over $500 a ton for the same quality of armor. The upshot of the matter was that the various manufacturers refused to furnish any armor plate at $300 a ton, and thus was inaugurated the controversy which has continued up to this time, and as a result of which work on some of our war vessels has been seriously delayed.

The latest development in armor manufacture is, of course, what is known as the Krupp process, a method which gives a product vastly superior to the Harveyized material. The Krupp process is the result of years of experiment and the expenditure of a large amount of capital. Tests of the first plates were made on Krupp's proving grounds in Meppen, Germany, in 1895, but the records were not announced at that time. Subsequent tests, made before the ordnance engineers of the European admiralties, showed from 20 to 30 per cent more resistance to the attack of armor-piercing projectiles than Harveyized armor. As a result of these tests the new armor was immediately adopted by England, France, Russia, Japan and Germany. When Krupp offered the right to manufacture this armor to the big steel works of the world, stipulating the payment of a large sum for the license and a royalty of from $45 to $50 per ton in addition, the Carnegie and Bethlehem companies both contracted for the manufacturing rights and sent experts to Essen to be instructed in the details of the new process.

The Carnegie Steel Co. made the first armor plate in accordance with the Krupp process in America, and the plate when tested by the bureau of ordnance of the navy department successfully withstood a gun fire of 25 per cent greater severity than the best Harveyized armor plate of equal thickness. In response to a request for estimates, the manufacturers offered to furnish armor manufactured by the new process to the United States government for $545 per ton, which included the royalty paid to the inventor. Despite the showing of increased cost made by the manufacturers, congress at the last session reaffirmed its limit of $400 per ton for armor for the vessels provided for under the act of May 4, 1898, amounting to about 10,000 tons, and reduced the price to $300 per ton including royalties for the 14,000 tons of armor for the vessels authorized by the act of March 3, 1899. Even with this limitation the navy department specified Krupp armor. Naturally there were no responses to the advertisement for bids.

The only armor contract that has been placed in some time by the United States government was for Harveyized armor at $400 per ton for the monitors Florida, Connecticut, Wyoming and Arkansas.

AMERICAN AIR COMPRESSORS IN GERMANY.

The Stilwell-Bierce & Smith-Vaile Co. of Dayton, O., has just shipped eighteen pumps, valued at $15,000, to Manila, for use in the $500,000 refrigerating and ice-making plant which the United States government will erect there. The plant was manufactured by the De La Vergne Refrigerating Co. of New York. Other recent shipments made by the Stilwell-Bierce Co. include eight pumps to China. A carload of pumping machinery was also sent to London a few days ago. The company is now turning its attention to the manufacture of air compressors on a large scale. To the famous Krupp works, in Germany, were recently forwarded six large compressors for driving pneumatic tools in their machine shops. Two air compressors were exported, a few days ago, to the German navy department for use in the government ship building yards. Three large compressors were forwarded to Beardmoor & Co., Limited, Clyde ship builders.

An unsuccessful effort was made this week to float the American line steamer Paris out of dry dock at Milford Haven. She made water rapidly and it was decided to allow the vessel to remain in the dock for a couple of weeks or until the spring tides occur.

UNITED STATES WEATHER BUREAU.

PROPOSED PLAN AND REORGANIZATION AND IMPROVEMENT WHICH IS MEETING WITH APPROVAL FROM COMMERCIAL AND MARITIME BODIES ALL OVER THE COUNTRY.

Commercial organizations in all parts of the country are giving approval in resolutions and in other ways to the measure now before congress for the reorganization and improvement of the weather bureau. The upbuilding of this service during the past four or five years under the direction of Chief Willis L. Moore is so fully appreciated by the agricultural, commercial and navigation interests that this measure of reorganization will, of course, be earnestly endorsed by these interests when it is known that the proposed change comes from Professor Moore with the approval of Secretary Wilson. One of the main features of the bill—H. R. No. 3988, introduced by James W. Wadsworth, chairman of the house committee on agriculture—are the provisions relative to retirement of the men whose lives have been devoted to the service. But this retirement is not to be of the government pension kind. It is simply a plan of organization supported in whole by the men of the service and not costing the government one penny. The scope of the bill and the conditions leading up to its introduction are fully explained in the following letter from the chief of the weather bureau to Mr. Wadsworth in his official capacity as chairman of the house committee on agriculture. Professor Moore says:

"During the past five years I have persistently worked to elevate the character of the personnel of the weather bureau and to establish a discipline and efficiency second to no other portion of the federal service. My efforts have been approved, and I have been fully sustained by both secretaries of agriculture under whom I have served. Particularly does Secretary Wilson take pride in the standing of the weather service. He has given to it much of his valuable time, and under his administration your committee has taken action which has resulted in expanding the weather service around the Caribbean sea and the West Indies, and strengthened it in the southern states and Rocky mountain plateau. I have made the draft of a proposed bill which I believe would effect the establishment in the weather service of an ideal merit system, complete in the co-ordination of all its parts, from the humblest employee to the head of the service. With the permission of Secretary Wilson, I submit this measure for your consideration with the desire that it be not introduced unless I am assured that it will have the approval of the committee on agriculture. With an experience of more than twenty years in the public service, both as a subordinate and as a chief executive officer, I am a firm believer in a merit system and in an economical and strictly business administration of public office. In the light of our present experience, I believe that the existing civil service law, while accomplishing much good, is still defective in its application to the weather bureau in the following particulars:

"First. That it attempts to meet the requirements of the widely varying conditions of the public service by a general law supplemented by regulations drawn by those who, no matter how honest and well meaning, can not know the necessities of the vast ramifications of the several departments and their numerous bureaus, instead of providing a separate law in detail for each department and for each important bureau of each department so complete as to render it impossible to embarrass the proper and expeditious handling of the public business, or to defeat the intent of congress by defective regulations; second, that it takes from the national representatives of the people the power to nominate, under proper legal restrictions as to age, health, and education, those who may compete for the classified service; third, that it neither prescribes the physical qualifications which a candidate must possess nor rigid legal conditions to restrict unjust promotions; fourth, that it permits regulations to be drawn and to assume the force of law which may usurp the proper functions of the secretary of a department or of the chief of a bureau, and thereby injure or destroy their discipline; fifth, that it does not provide a method whereby the service can be purged of its meritorious but old or disabled servants by an enforced assessment upon themselves and their co-workers. My criticisms have not for their object the injury of the present civil service law, but its improvement as applied to the weather bureau. I do not criticize the commission itself, for I know that it has accomplished a wonderful improvement in the character of the public service.

"I would briefly recapitulate the salient features in the proposed law, as follows: It apportions appointments among senators, representatives and delegates, without regard to their political faith. It provides that candidates shall be nominated by the representatives of the people, under such rigid restrictions as to age, physical condition and education as render it difficult, if not impossible, to effect the permanent appointment or the promotion of an unfit person. It prohibits the use of political or other influence to secure promotion or assignment, and I believe properly co-ordinates the prerogatives of congress and the executive officers of the government in the matter of the appointment to and the control of the federal service. It places each employee strictly upon his merits and compels him to work out his own salvation, while the present law leaves all this to the caprice of the executive officer or the rules of a commission. It prohibits the removal of any employee for political reasons, and makes his tenure of office secure so long as his services are advantageous to the government, and no longer. Without one cent of expense to the government, it provides for the separation from the public pay rolls of disabled or aged officials, and at the same time provides support in their hours of need."

Professor Moore gives the following reasons for urging special legislation in favor of retirement for weather bureau employees: They work 365 days in a year. Their hours of duty are longer, on the average, than those of employees in any other branch of the public service. On the Pacific coast the first observation is made between 4:30 and 5:00 a. m., while on the Atlantic coast the offices can not be closed before 11:00 p. m., and often later. They are subject to more intense mental strain than is the case in other departments. They must be on the alert at all times to detect the first premonitions of storm development and remain constantly on duty in order to distribute warnings that may be received at any moment. They are subject to great vicissitudes of climate, being required to serve, as the exigencies of the service may require, in almost any degree of latitude, from Alaska to the West Indies. By reason of the peculiar organization of the service its employees are in a large measure deterred from obtaining a fixed habitation or enjoying the privileges that accrue to long residence in a community. Changes of station generally operate to the financial disadvantage of the employees. It requires many years of experience in the weather bureau to become thoroughly efficient in the higher duties of the service, and constant study is necessary in order to keep pace with the developments of meteorological science so that this knowledge may be practically applied. Experience has proved that the most efficient men are those who entered the service when they were young and vigorous and gained proficiency as a result of study of the weather conditions as they were daily presented. It is not possible for an employee of short term of service, however intellectual and energetic he may be, to correctly correlate the various conditions presented on the weather chart, and deduce therefrom practical forecasts. It is a life work, and it is not just that those who have devoted the best years of their life in becoming proficient in this practical science, to the exclusion of all other vocations, should be turned away helpless and poor in their old age, simply because congress has refused to permit them to organize a plan of retirement supported in whole by themselves, and not costing the government one penny; but on the contrary, saving much to the government by taking from the rolls all who for any reason are partly or wholly incapacitated. In no other civil branch of the government service is the efficiency of the duties performed so dependent upon an unfailing and intelligent simultaneous working of a large force of men scattered over a wide area, whose operations are commanded by a central head or chief. The observers of the weather bureau are on guard to give warning when danger threatens, so that measures of safety may be taken by those whose lives and property are threatened. Effective discipline must be enforced to insure the prompt and intelligent execution of every order without hesitation or question and without regard to the personal comfort or safety of the one to whom the order is given. In either case, dilatory or inefficient action on the part of an individual may prove disastrous and possibly render useless the work of all others engaged in the same undertaking. The observer must be prepared at all times to obey without protest the word of command to advance to any place or position where an exigency may require his service. Observers are now on duty nearly from the arctic circle to the equator, and to any point within that vast region any official may be detailed at any moment. The observer must not desert his post until relieved by official orders, no matter what hardship or danger threatens. The weather station requires an observer to be, in effect, always on duty, and in time of emergency to remain at his post as long as danger threatens. Unlike other classes of government employees, the observer can not have the benefit of fixed periods of labor or of rest, or certain place of residence.

"In the case of the soldier," says Professor Moore in conclusion, "the most efficient and reliable service is obtained by inspiring in him both the fear of punishment for the neglect of duty and the hope of reward for work efficiently and promptly performed. With good behavior he has security against removal; if disabled or killed, a pension for himself or his dependents lessens the hardship of misfortune; if he serves a given period he may retire from the service on an allowance. If this system, which is found to be the most efficient, is successful in obtaining and keeping good soldiers, then in the case of the civil organization which guards the lives and property of all the citizens of our country, a system which comprehends the same elements, but modified to suit a corps of civil employees, would seem to promise equally good results."

OFFICERS AMONG MARINE ENGINEERS.

Marine City, Mich., No. 53—President, S. C. McLouth; vice-president, Wm. Fritz; recording secretary, E. H. Hill; corresponding secretary, Harry Stone; financial secretary, Frank Ouelette; treasurer, Frank Parker; delegate to national convention at Washington, Jan. 16, Harry Stone; alternate, Frank Parker.

Cleveland, No. 2—President, Evan Jenkins; vice-president, Charles Clark; recording secretary, Lawrence Regan; financial secretary, H. W. Burton; corresponding secretary, J. B. Haywood; treasurer, John M. Kirby; trustees, M. J. Burns, William Kennedy, Henry T. McAuley; delegates to national convention, Fred M. Harmon and Evan Jenkins.

Detroit, No. 3—Past president, Wm. Tyndall; president, F. McDonald; vice-president, F. Seiler; recording secretary, Ed R. Dungan; corresponding secretary, J. McClure; financial secretary, F. Kenyon; treasurer, E. R. Blanchard; conductor, William Drysdale; doorkeeper, E. Naglevoort; chaplain, M. McNamara; trustee for five years, F. Kenyon; delegates to national convention, Edward R. Blanchard, William P. Tyndall and Albert L. Jones.

Toledo, No. 37—Past president, J. A. Page; president John Marshall; vice-president, Richard Curtis; recording secretary, James L. Aznoe; corresponding and financial secretary, E. D. Lock; treasurer, F. N. Weis; chaplain, Thomas Winship; conductor, Levi S. Keldon; doorkeeper, Eugene Passano; trustees, E. D. Lock, F. N. Weis, George Curtis; representative to the national meeting, James McGlynn; alternate, James L. Azone; business manager, E. D. Lock.

Manitowoc, Wis., No. 77—President, Philip Roth; vice-president, Frank Heffernon; corresponding and recording secretary, Joseph Weber; financial secretary, John Jorsch; treasurer, Philip Roth; conductor, Edward Dusold; chaplain, Fred Larsen; doorkeeper, Joseph Gill.

The navy department and the light-house board, acting jointly, will arrange ere long for the establishment of wireless telegraphy stations in light-houses and light-ships of the United States. Experiments on an extensive scale will, of course, be conducted on vessels of the navy and in the light-houses to ascertain how the system may be improved before there is an attempt made to actually install it.

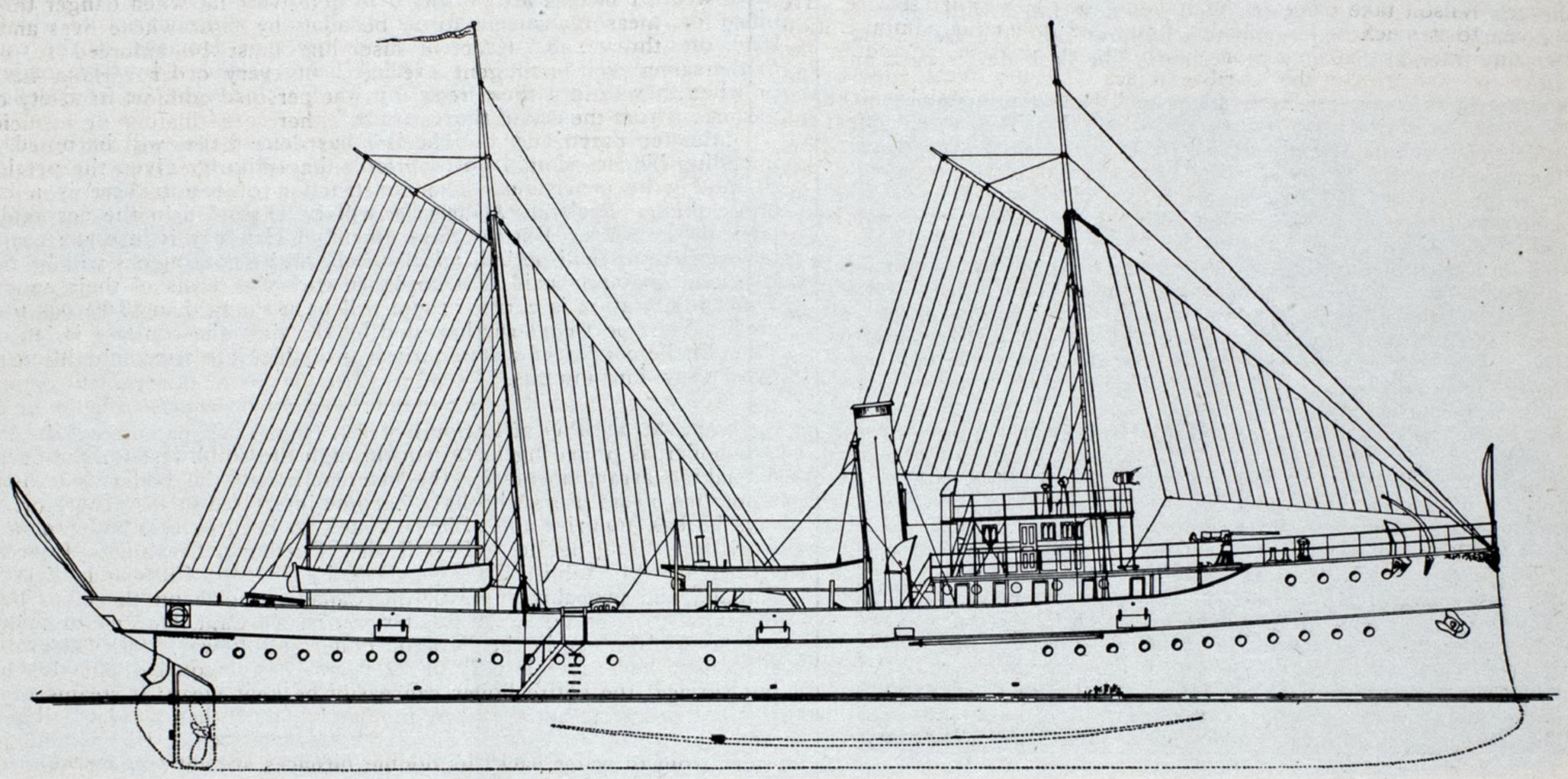
NEW LAKE REVENUE CUTTER.

Plans have just been completed for the new revenue cutter designed for service on the great lakes and for which the last congress appropriated $165,000. The new cutter will be a vessel of very handsome appearance and of the following dimensions: Length over all, 178 feet; length between perpendiculars, 162 feet; breadth of beam, molded, 30 feet; depth at side, amidship, 15 feet. The hull is to be of steel throughout, and will be fitted with eight watertight athwartship steel bulkheads, made of 7½, 8½ and 10 pound per square foot plates, stiffened with vertical stiffeners, 3 by 2 inches, of 4.1 pounds. These bulkheads are to be tested and made perfectly watertight by calking, and no cement or any other foreign matter is to be used. The keel is to be of the flat type, composed of two thicknesses of plates, 14 pounds per square foot, well riveted together. Above these inner and outer flat keels will be built a vertical keel of 15 pounds per square foot, reinforced with double angles, 3 by 3 inches by 7 pounds at lower edge and 2¾ by 2¾ inches by 6 pounds at the top edge. There are to be six intercostal longitudinals, three on each side of the vertical keel, standing square with the outside plating; the four inner ones to be of 12½-pound plates and the two outer ones of 10-pound plates, flanged at the bottom edge and riveted to the outside plating, the top edge secured to the reverse bars, etc., by continuous double angle bars of 3 by 2½ inches and of 6.6 pounds per square foot. The main frames of the vessel stand square with the base line, and are to be made of Z-bars, 5 by 3¼ by 3¼ inches and of 11.6 pounds per foot. The upper flange of the Z-bar is cut off at the turn of the bilge to the lower end of the frame, forming an angle bar 4 by 3 inches; this lower end cuts off against the lower continuous angles of the vertical keel. At the extremities of the vessel the frames are formed of 3 by 3 inches by 7-pound angle bars and 7.5-pound bracket plates. Between the main frames and reverse frames, forward and aft, floor plates of 10 pounds per square foot are worked; within the engine and boiler spaces 15 and 12-pound plates are worked; the floors forming boiler saddles 17.5 pounds per square foot.

The outside plating is formed of 14 pounds per square foot below the main deck; above the main deck 10 pounds per square foot will be used. The main deck beams are formed of angle bulb 6 by 3 inches of 12.3 pounds, split and turned down at the ends to make good connection with the main frames. The berth deck beams are formed of angle bars 3 by 2½ inches by 6.6 pounds per square foot, secured to frames by 8.5-pound bracket plates. The forecastle deck beams are of angle bars 3½ by 2½ inches by 6.6 pounds per square foot. The frames and beams are spaced throughout 24 inches. The deck planks will be of Georgia yellow pine throughout, 3 by 3 inches, in lengths of 25 to 30 feet, and will be calked according to the standard method of calking.

The pilot house and chart room are located on the forecastle deck, just aft of the foremast. These houses are to be built of steel complete except the doors in the pilot house. The steering of the vessel is done from here by a steam steerer, which is so arranged that it can be operated by hand or steam from the pilot house, and steam from the top of bridge. A screw hand gear is also fitted aft over the top of rudder head. The berthing space for the crew is on the berth deck forward and also under the forecastle deck. Mess lockers, water closets, bath rooms, etc., are fitted for the men's convenience. The petty officers, boatswain, carpenter and oiler have their staterooms and mess rooms directly aft of the crew's space on the berth deck. The wardroom officers are located on the berth deck aft of the machinery space. The ward dining room runs the whole length of wardroom between the wardroom officers' staterooms. Buffet, writing desk, tables, chairs, etc., are fitted for the convenience of the officers. The captain's quarters will be located directly aft of the wardroom, under the main deck, where he will have his pantry, office, cabin stateroom, bath room, etc.; all fitted in the best possible manner.

The main engine will be of the vertical, inverted cylinder, direct acting, triple expansion, surface condensing type, with cylinders of 17, 27 and 43 inches diameter and 24 inches stroke. Steam will be furnished by two single-ended boilers of the horizontal return fire tube type, constructed for a working pressure of 160 pounds per square inch. Each boiler will have three corrugated furnaces of 39 inches internal diameter. The total heating surface will be about 3,000 square feet; grate surface 108 square feet. The boilers will be 11.8 feet outside diameter and 10 feet long over all. Independent feed pumps will be fitted in fire and engine rooms. The forced draft will be of the closed fire room system; air will be supplied by one blower, which will discharge into the fire room. There will be one hydro-pneumatic ash ejector. Steam reversing gear, hand pump, circulating pump of the centrifugal type, bilge ejector, air pump, distiller, etc., are to be furnished complete.



NEW REVENUE CUTTER FOR SERVICE ON THE GREAT LAKES, FOR WHICH THE PLANS HAVE JUST BEEN COMPLETED.

A PILOT YACHT.

Attention has recently been attracted to several steel pilot boats of American construction which are stationed at New York, Philadelphia and other ports on the Atlantic coast, and for purposes of comparison it may be well to describe the steam yacht Commander Cawley, which was recently turned over to her owners, the Humber pilots, by her builders, J. T. Eltringham & Co. of South Shields, Great Britain. The vessel is 129 feet in length, 23 feet beam and 11 feet 6 inches in depth and takes Lloyd's highest class as a steam yacht. The deck house extends for about two-thirds of the vessel's length, the forward part forming the stateroom for the two captains who take alternate duty on board the vessel. In this room are arranged the switches for the signal lights and there is also a voice pipe to the wheel screen. Aft of the stateroom is the lobby from which the main staircase leads to the saloon and smoke room. The latter is on the port side, while on the starboard side there is a pantry and steward's room. The main saloon contains twenty-four berths for pilots. At the forward end of the saloon there is fitted a lavatory and baggage room, and at the top of the staircase and separated from the lobby by a bulkhead is the galley, which is considerably larger than is usual in a vessel of this size. The engine and boiler casings are carried up to the bridge deck, making the apartments very airy. At the after end of the casing is provided accommodation for six apprentices. The engineers are also berthed aft, while the extreme after portion of the vessel is fitted as a store. On the main deck there is fitted special gear for the rapid manipulation by machinery of the boarding boats, a peculiar type of windlass and davits being used. The engines are of the triple expansion type with cylinders 12¼, 19½ and 32 inches diameter, with 22½ inches stroke of piston. The auxiliary machinery includes a centrifugal pump, ballast pump, dynamo, steam steering gear and steam windlass. The vessel is lighted by electricity and has a speed of 10½ knots.

OFFICERS OF MASTERS' AND PILOTS' ASSOCIATION.

Buffalo harbor—Captain, C. E. Fuller; first pilot, B. McCave; second pilot, W. T. McCullough; chaplain, S. D. Hames; captain's clerk, R. M. Lamphier; purser, M. J. Halleran; trustees, G. H. Vroman, George McMinn and H. Warwick; delegate to grand harbor, R. M. Lamphier; alternate, Charles Nash.

Cleveland harbor—Captain, L. T. Brogan; first pilot, F. Place; second pilot, Martin Johnson; purser, Charles A. Benham; captain's clerk, Harry C. Doville; chaplain, William Allen; trustees, B. Tripp, W. A. Collier, L. T. Brogan; committee on resolutions, B. Tripp, A. H. McLachlan, F. Place.

Detroit harbor—Captain, H. C. McCallum; first pilot, B. F. Ogden; second pilot, P. H. Trezise; purser, D. A. McLachlan; purser's clerk, E. S. Pickell; Chaplain, M. C. Cameron; quartermasters, R. W. England and William Wilson; deck watchman, William McGregor; delegate to grand harbor convention, H. C. McCallum; alternate, B. F. Ogden.

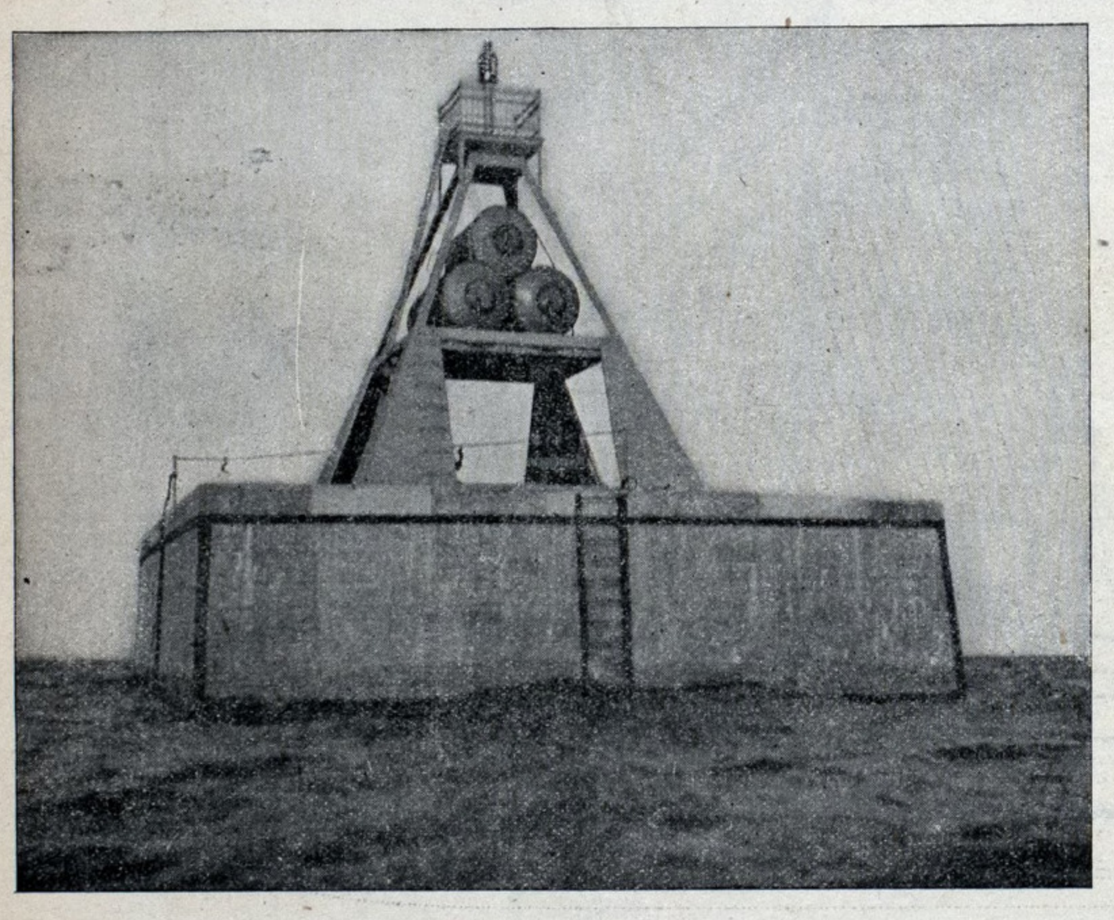
The Bethlehem Steel Co., South Bethlehem, Pa., has just shipped some side armor plate to Newport News for the battleship Illinois and 60 tons of casement armor to the Cramp yard for the battleship Alabama.

APPLICATION OF PINTSCH GAS.

VARIED USES IN LIGHTED AIDS TO NAVIGATION—ITS USE HAMPERED BY INSUFFICIENT FACILITIES IN THE LIGHT-HOUSE SERVICE.

The extent to which Pintsch gas, manufactured by the Safety Car Heating & Lighting Co. of New York, is being used in aids to navigation throughout the United States and the adaptability of this gas to light-house purposes is illustrated in a new form of beacon pictured herewith. This structure is on Racine reef, Lake Michigan, and was only recently completed. Until a short time ago the Pintsch light was known to the vessel interests only through its use in the famous gas buoys, which are made to burn continuously for several months without recharging, and which are distributed in great numbers along the lakes and on the Atlantic coast. The Racine reef light is a permanent structure, so equipped as to be charged with gas alike to the buoys. It represents a new application of gas. The spot marked by this light is difficult of access and a light-house of the ordinary kind in this locality would have cost a great sum of money. The light illustrated herewith was established at a cost of probably not more than $15,000, and there are, of course, numerous other places throughout the country where similar structures could be erected to great advantage, especially on piers that are exposed to heavy weather and where proper attention cannot be given to ordinary lights in such weather, but where the gas, arranged to give light as in the buoys, would burn at all times. The Racine reef structure bears a tank carrying sufficient gas to give light for 100 days. It is charged, of course, as the buoys are charged by supplies from the tenders of the light-house service. Similar lights are also provided at several places in the St. Mary's river and the St. Clair river, connections of the great lakes, but in these rivers, where there is no great stress of weather, the lights are not so pretentious as the one on Racine reef.

All the gas buoys of the Pintsch kind are now fitted with burners that may be changed from a fixed light to a flashing light, the flash being arranged for any interval that may be desired. The flash device is of an



RACINE REEF PINTSCH GAS LIGHT, LAKE MICHIGAN.

automatic kind and very simple, and colored globes may also be used around the burners so as to make still further distinction between different buoys if desired. The manufacturers have also about perfected a bell arrangement, automatically operated by the gas on its way from tank to burner and without loss of the gas, which should, of course, prove far superior to the kind of bell buoy that depends upon wave motion, as the latter is practically useless when there is no motion of the water. This bell device and other improvements in the gas buoy would undoubtedly be fully developed by the New York company and applied at low cost to hundreds of dangerous places in navigable waterways, if it were not for the difficulty that is encountered by vessel interests in the matter of appropriations from the government for these very desirable aids to navigation and more especially for the equipment of light-house tenders to care for them. The vessel owners of the great lakes are even now trying to secure from the government a return of moneys expended for private lights, while it is known that several gas buoys were in Detroit all of last season unused because the light-house vessels were not fitted to supply gas to them. A tender to care for buoys of this kind in the rivers between Detroit and Lake Superior is especially needed. Officials of the Lake Carriers' Association are trying to induce the light-house board, in the absence of a new tender for the purpose, to have the light-house steamer Marigold fitted temporarily with gas tanks, so as to get some relief on this score next season. The vessel men are of the opinion that two or three vessels should be chartered for a season or two to assist the regular light-house tenders in all kinds of work which they perform on the lakes, as it is evident that the regular boats of the service cannot take care of the work that has been crowded upon them, and there is no possibility of relief in the way of new tenders for two years to come. They could not be built in less than a year, even if the money was available. The last congress made an appropriation for a new tender for Lake Michigan (ninth district) but practically nothing has been done towards the construction of the vessel. The light-house board did not until a few days ago ask the inspector of the ninth district what kind of a vessel he thought was needed. The delay is due, it is said, to the appropriation not being sufficient to build the vessel under the general advance in costs that has taken place of late. It is certainly a matter of great disappointment to the vessel interests of the lakes that this unsatisfactory condition exists as to vessels to care for the work of the light-house institution.

A VERY LARGE HARBOR CONTRACT.

Dredging and breakwater contractors in the United States who have announced their intention of bidding for the extensive improvements to be undertaken at the port of Montevideo, South America, may be interested in the following particulars submitted by United States minister French:

"The president is authorized to expend up to $12,500,000 gold, taken from the resources voted to that effect, in the execution of the works. The financial commission in charge of the work shall pay the certificates issued by the technical administrative office in gold, unless the contractor accepts payment in port obligations. The commission is authorized to negotiate the placing of the port obligations within or without the country, under the conditions indicated; also to pledge up to $2,000,000 of the obligations, if it is found necessary to provide funds for the payment of work certificates, or while awaiting a favorable opportunity for the placing of the bonds, or to guarantee the contract; all with the permission of the executive. The technical administrative office may issue provisional certificates, two-thirds of the value of which shall be paid by the financial commission. The provisional certificates shall represent the specified value solely of the materials of certain importance accumulated in the country for the port works. In this case the contractors shall declare, on applying for the certificate, that the materials may be acquired by the state on the latter completing the payment. The contractor who undertakes to carry out the port works shall in no case have right to be indemnified for losses or damages to his installations and material, of whatever kind, or whatever the nature of these losses or damages, or the causes of the same, even in the case of their being produced by force majeure, or when they do not arise from any want of foresight, or from deficient means, or from misuse of those means."

Minister Finch adds: "The law has defects that will be noted, but intending bidders should not overlook the authority given the president to modify its provisions. The construction of a port here is a large undertaking. Probably $15,000,000 will be expended in the accomplishment of the work. But the government of Uruguay is in earnest, and I believe the port will be built; I also believe the contractors will be regularly and promptly paid in accordance with the terms of their contract. If my information is correct, there will be not less than $3,000,000 to the credit of the port-construction fund by the time the contract is let, even should it be concluded at the earliest probable date after submitting proposals, say, four months."

Capt. M. De Puy of 19 South street, New York, patentee of the Paragon boiler, is preparing for a trip through the southwest for the purpose of making arrangements for the manufacture of the boiler and to meet numerous steam users who have become interested in his generator. He says he has inquiries and orders enough to keep several boiler plants in work for a long period. He will visit Pittsburg, Cincinnati, Louisville, Evansville, St. Louis, Chicago, Detroit, Toledo, Cleveland, Erie and Buffalo, and probably some of the Canadian ports on the lakes before returning to New York. In a letter just issued Capt. De Puy summarizes points of advantage in the Paragon boiler as follows: It is compact and so constructed as to last 15 or 20 years; has unequaled effective heating surface; the entire boiler can easily be kept clean; it steams rapidly on half the grate surface used in many boilers; has a large surface of water for steam to emanate from; its side and center legs extend from water front to water back; its double furnaces are entirely surrounded by water; no expensive bracing is required over fire boxes; a Paragon boiler of 100 horse power has 200 slot openings over side legs, and one-fifth of the shell is cut out over the center leg, which insures a free circulation of water throughout the entire boiler; no heat is wasted on expensive brick walls or asbestos casing, which require continual repairing and never boil water; finally the boiler is adapted for marine service and stationary plants of every description.

In another part of this issue reference is made to a bill now before congress which proposes to do away with the present system of compulsory pilotage under state authority. The bill provides, alike to similar measures defeated by the organized efforts of the associations of pilots in the past, that masters of vessels in entering or leaving ports of the United States are to be allowed to navigate their vessels unaided by a pilot, and any master who can pass the required examination before the steamboat inspection service will be authorized to act for any vessel arriving at and departing from designated ports. If the pilot service was regulated uniformly by the general government, there would probably be no need of a bill like that now before congress; but it will be agreed by everybody who is not specially interested in the matter that the present system is wrong and should be abolished.

The Standard Tool Co. of Cleveland is sending out a very handsome illustrated catalogue, accompanied by a calendar of equally artistic appearance. The Standard company manufactures twist drills, reamers, chucks, spring cotters, taps, flat spring and riveted keys, milling cutters and special tools. The company carries in stock a large line of finished tools for immediate shipment and has increased its facilities in every department to turn out work promptly. This company has a New York office at 94 Reade street and branches in the principal cities of the world.

The president has issued an order setting apart seven acres of the government reservation in the island of Oahu, Hawaii, as a site for a United States marine hospital for the port of Honolulu.

THE WEEK IN THE SHIP YARDS.

Rumors of a great corporation to absorb all the principal ship yards in the country are again revived. Col. J. J. McCook of New York city is given credit of being at the head of the enterprise. According to newspaper dispatches, the yards which the combination will seek to control include the Cramp, Newport News and Bath Iron Works plants, the yard of the Union Iron Works, San Francisco, and the Nixon yard at Elizabethport, N. J. Mr. Collis P. Huntington, when told that it was said the announcement of the combination was only being withheld for fear it would defeat the shipping subsidy bill, answered: "Nonsense. The shipping bill would not be affected. It is a bill that will primarily benefit American labor."

It is now stated that contracts have been fully closed for the construction by the Newport News Ship Building & Dry Dock Co. of the four steamers for the Morgan line, mention of which was made in a recent issue of the Review. The vessels which are designed for the New York-New Orleans service, will each be 406 feet in length over all, 48 feet beam and 33 feet 9 inches depth. Each will be of 4,665 gross or 2,905 net tons burden. The vessels will be fitted with triple expansion engines that are to have cylinders of 33, 52 and 84 inches diameter and 54 inches stroke, to which steam will be supplied from three double-ended boilers.

A dispatch from Elizabeth, N. J., states that the Electric Launch Co., formerly of Morris Heights, New York city, has purchased a large tract of land in Bergen Point, N. J., opposite Scheuler's island, and will proceed at once to install there a complete ship building plant, construction beginning with the provision of docks, piers and ways. It is stated that the new plant will not only construct electric and steam launches, but will undertake later on government contracts for torpedo boats, destroyers and other small craft.

John E. Mar has under construction at his ship yard at West Haven, Conn., a steam transport for the Brooklyn Grain Elevator Co., the cost of which will be about $100,000. The vessel is 160 feet in length. Representatives of the company who recently visited the West Haven yard are so well satisfied with the work done on the vessel now on the stocks that they have opened negotiations with Mr. Mar looking to the award of contracts for three more such craft, each to cost $100,000.

The steamer W. H. Kruger, building for the Truckee Lumber Co. of San Francisco, was launched a few days since at the Lindstrum ship yard at Aberdeen, Wash. The vessel will be towed to San Francisco to receive her machinery. Mr. Lindstrum has just secured contracts for the construction of two wooden schooners and is increasing the capacity of his yard. He has also built a three-story hotel where quarters are provided for about seventy of the men employed in the yard.

The city of Boston has contracted with William McKie of East Boston for the construction of a propeller ferryboat, which will be a duplicate of the Noodle Island, the last boat placed in commission. The contract calls for the completion of the vessel in readiness for service by August. The engines will be constructed by the Atlantic works, East Boston, and will be of the double compound type. Richard F. Keough is the designer of the vessel.

Capt. James Robertson and E. Hansen have established a plant at Anacortes, Wash., for the construction of small steam vessels, pile drivers, scows, and in fact almost every class of craft. They will pay especial attention to the demands of Puget Sound navigation. Mr. Hansen is a naval architect and both gentlemen have had some experience in the line of work in which they are about to engage.

The William R. Trigg Co., Richmond, Va., has recently found it necessary to decline two contracts, owing to the crowded condition of its yard. The latest of these was offered by the Algoma Central Railway Co. of Sault Ste. Marie, Canada, and was for two first-class freight and passenger steamers for service on Lake Superior.

A number of new vessels are being projected for Alaskan service and it is expected that contracts for several of them will be closed within a short time. The Alaska Steamship Co. of Seattle, Wash., is credited with the intention to add some steamers to their fleet in service on the Seattle-Lynn canal route.

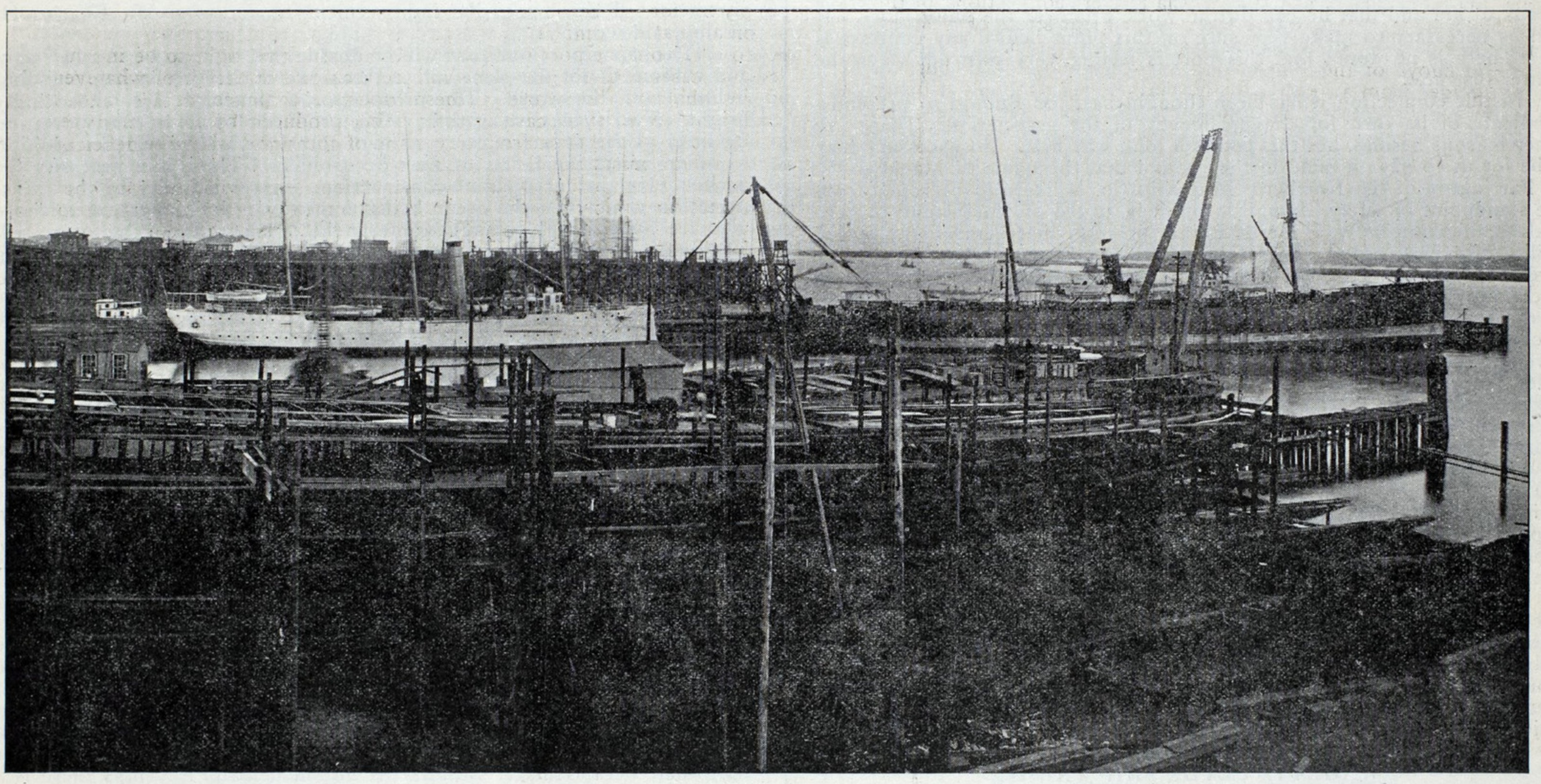
Ice in the Christiana river has caused serious delay in the launch of the large lighter building for the Munson Steamship Co. by the Jackson & Sharp Co. of Wilmington, Del. The vessel is 115 feet in length. The company has just secured an order for three duplicates, all being designed for Cuban service.

The George Lawley & Son Corporation of East Boston, Mass., has prepared plans for a new launch to replace the Frank Thompson, which was burned at the time of the Harvard boat house fire. The new launch will be 51 feet in length, 8 feet beam and 31 inches draught.

George A. Gilchrist of Belfast, Me., has contracted to build a three-master schooner for George McQuestion of Boston, Mass. The work will begin in a few weeks and the craft will be of 550 tons burden.

The Truscott Boat Co., St. Joseph, Mich., is filling an order for four boats to be shipped to Johannesburg, South Africa, and a launch destined for Australia.

A new tug, the Cohannet, building for the Staples Coal Co., Taunton, Mass., was launched a few days ago at Bath, Me.



THE YARD OF THE WM. CRAMP & SONS CO. AT PHILADELPHIA, THE CAPACITY OF WHICH IS NOW BEING DOUBLED.

GRAIN SHOVELING CONTRACT.

Aside from the presidency of the Lake Carriers' Association, which is not as yet decided by any means, although the annual meeting occurs next week, the question of most importance to vessel owners just now is the Buffalo grain shoveling contract. It is said in the newspapers that the labor union leaders of Buffalo will insist upon the vessel owners giving the grain shoveling contract to some one of their selection. The proposition that the ship owners, who are paying for this work shall not have the right to employ whom they please seems so ridiculous that it will not be believed in the absence of a direct statement to that effect from the labor leaders. The vessel owners will certainly go to Detroit intending to make all reasonable concessions and to do what is best to avoid trouble at Buffalo next spring. They would be pleased to turn over the grain shoveling matter entirely to the elevators if it was at all probable that such a course could be followed satisfactorily, but they certainly will not be forced to accept a contractor from the ranks of the labor unions unless there is some plan along this line, as yet unheard of, that would give assurance of a thoroughly business-like arrangement. The grain shovelers may possibly have such a plan to present to the Detroit convention, but if they have not it is quite probable from present appearances that the contract will be given to James Kennedy, and if forced to it the vessel men must undertake another struggle next season for control of their own affairs in this grain shoveling business as in other similar work. Members of the association are all very anxious to avoid labor trouble of any kind next spring, and the great majority of them are in favor of very liberal wages in all lines, but they realize that there is a probability of more difficulty with labor than in the past, and an effort will therefore be made to select officers and shape committees with this thought in view.

GRAIN SHOVELING QUESTION.

IT DEMANDS THE BEST THOUGHT OF THE VESSEL INTERESTS—BUFFALO VIEW OF THE SITUATION.

Buffalo, Jan. 10.—It is to be supposed that the vessel interests are aware that the vital subject to be taken care of at the annual meeting of the Lake Carriers' Association next week is the Buffalo grain shoveling contract, but there is not likely to be any settling of it on the "Go thou" principle, which may not be so well understood. The matter is too deeply entangled in local politics for that. It must be made the subject of the nicest adjustment or there will be a repetition of the scenes of last spring. Buffalo and the lakes lost too much then to invite anything of the sort now, especially by a mistake made at the meeting.

There seem to be two points settled. At least the most interested vessel men put it that way. First, that the scoopers cannot be handled if the contract is given to W. J. Conners. At the same time it is not thought that he will put in a bid for the work, so it is probable that this point is out of the way. The other bad place in the consideration is that the vessel owners will resist any proposition to give the contract to the shovelers' union. "Not one in a hundred would think of such a thing," was the way a leading vessel man replied today, when asked for an opinion on the chances. So it is better another fight than that, apparently, in the minds of the vessel interests.

It remains to be seen, then, first whether the union will insist to the end on taking the work direct, whether it will yield to a lower bid, in case one is put in, and after that whether any other bidder can assure the association that he can control men enough to take the work out of the hands of the union and ignore it. James Kennedy is now saying that he means to bid and that he can do the work whatever the union does. It will be necessary to make very sure on this point before any contract is let. There is no doubt that this port is feeling very unsteady over the matter just now.

In this connection it has been thought best for Buffalo to present a candidate of its own for the presidency of the association. There are other reasons besides, but this comes a long way first. So necessary may it be for us to have a man on the ground that the name of Manager W. C. Farrington of the Northern Steamship Co. is likely to be urged from the standpoint of safety, though it might be urged on the ground of general qualification as well, for he is in a position that demands executive ability of a high order. Being the direct representative here of the interests of James J. Hill, the manager of the Great Northern lake line, he is certainly able to meet an emergency of no ordinary moment. Buffalo does not feel just now like complaining because Cleveland has done what it could to absorb an association which was originated here and readily given to the lakes in general as soon as it was apparent that it could be made more efficient in that form. Let Cleveland note now that there is a good reason for asking a change of control for at least a season and there will be no difficulty. There ought to be none anyhow, and certainly nobody in the vessel interest will permit any mistake to be made now if the case is well understood. This port lost the handling of 70,000,000 bushels of grain last season and a corresponding amount of package freight, coal and ore, mainly on account of the strike, and it does not appear that any other lake port was much the gainer on that account, so there is need of at least a word to those who may not be fully awake to the situation.

The objection to the dam project and the Corliss bill generally has been increased by attention being called to the way the ice grounds and piles up at the mouth of the lake in spring with no sort of barrier at that point except shallow water and a narrowed passage. Such a structure would without doubt be the source of endless claims against the government from low-land residents, not only in Buffalo but elsewhere on Lake Erie, as well as the other lakes, if the device is put into use BISON.

WAGES IN CLYDE SHIP YARDS.

Samuel M. Taylor, United States consul at Glasgow, Scotland, submits to the state department in connection with a special report on the subject of ship building in Scotland, the following table dealing with the rates of wages now ruling in the Clyde ship building and marine-engineering trades, fifty-four hours per week:

Workmen.	Wages.	Workmen.	Wages.
Engineers (general) per hour...	$0.16	Plumbers (special men engaged) per hour.....	$0.20
Pattern makers, per hour.....	.17	Cabinetmakers (general) per hour	$0.17 to .19
Fitters (general, and not on piece work) per hour.....	.16	Riveters;	
Turners (iron and steel) per hour.....	.16	First, per day of 9¾ hours....	3.65 to 4.38
Molders (brass) per hour,.....	.20	Second, " "	3.65 to 4.38
Molders (general).....	.17½	Plate setters." "	2.19 to 3.04
Boiler makers (on 'stab wages) per hour	.18	Plate laborers and adjusters, per day of 9¾ hours.	1.22 to 1.70
Hole borers (on 'stab) per hour	.17	Laborers (general) per day of 9¾ hours	.97 to 1.22
Holders-on ('stab) per hour	.16	Brass molders, per hour.....	.17
General iron-worker's wages, not on piece, and engaged by the builders, per hour.....	.18	Cabinetmakers (a large amount of this class of work is done by contract outside the yards) per hour.....	.17
Ship joiners (members of the Associated Carpenters & Joiners' Society of Scotland) per hour	.17	Special turners and model makers, per week.....	6.81
Shipwrights (members of the Associated Shipwrights' Society of England and Scotland) per hour.....	.17	Special metal workers and lofts men, per week.....	10.95
Blacksmiths (members of the Associated Blacksmiths Society of Scotland) per week..	6.56	General laborers, per hour.....	,11
Hammer men (two trade societies) per hour..	.15	Draughtsmen (ship and engineer) on Clyde, per week.....	6.08 to 12.16
Holders-on (two societies) per week	$2.19 to 3.04	Store men (ship building and engineering) per week	7.2[illegible] to 12.16
		Painters (general) and red leaders, per hour	.13½ to .15

The Calendar issued by the Nickel Plate Road will be mailed to anyone who will send their address to the General Passenger Agent, Nickel Plate Road, Cleveland, O. No. 192. Jan. 15.

IMPROVEMENTS IN THE CRAMP WORKS.

The Review last week made brief mention of improvements now in progress at the works of the Wm. Cramp & Sons Co. at Philadelphia. They are of a very important kind. This ship yard, including the additions recently made, covers more than 45 acres. The new machine shop, upon which work was begun some time ago, will be 350 by 141 feet, a fire-proof structure, thoroughly equipped with power traveling cranes and every other adjunct for facilitating economical operation. Twenty dwelling houses have been torn down to make way for a new blacksmith shop, and twenty-five additional dwellings were displaced in order to afford a site for a new power house, from which will be furnished electrical current for both power and lighting purposes. Pumps of various kinds, including those for fire protection, and the air compressors supplying pneumatic tools, will also occupy this building. It is eventually intended to displace almost all the engines in use throughout the works by motors. In addition to the half dozen shipways already in the yard, two others will be constructed at the southern end, each having a length of 750 feet, which will make them, it is claimed, the longest in the country. The Review has already made mention of the three traveling cantilever cranes being installed by the Brown Hoisting & Conveying Machine Co. of Cleveland, and of the extensive additions to be made to the pneumatic tool equipment in the near future. The pier purchased from the Reading Coal & Iron Co. has been extended to a length of 1120 feet, and another pier at the other end of the yard has been built on similar lines, thus enlarging the capacity of the fitting out docks. In the southern end of the yard will be erected shops for punches, shears and rolls. Particular attention is to be paid to the facilities for handling material in the yard. There has been planned for this purpose a complete system of tracks, sidings and switches, not only from the railroads but throughout all the various departments. Referring to the improvements under way, Mr. Charles H. Cramp said recently:

"The capacity of our yard will be double that of a year and a half ago, and without doubt the place will rank as one of the largest ship building industries of the world. The prospects for business are exceedingly bright. Two successive wars have been monopolizing the transportation facilities of the ocean in carrying men and materials of war, in addition to other things incidental to such occurrences. There is a necessity for a change in the methods of construction, greater capacity in the transportation vehicles of the ocean being demanded. It is apparent to those who are familiar with the situation that the ocean traffic of the future will be done in vessels of large size, and consequently the necessity for ship yards which have heretofore been building small tramp ships will be entirely eliminated. To illustrate clearly, I may say that at the present time a large number of transatlantic steamers, measuring between 600 and 700 feet, and others between 550 and 600 feet long, are being built. The increased size demanded means much larger investments of capital, and of necessity precludes the possibility of a private individual embarking in the business. It is my opinion that the ship building enterprises of the future will be conducted by great corporations. Another point worthy of note is that these large works will demand structural material of huge proportions and in great quantities. This, of course, means much to both the manufacturer and the wage-earner of America. The fact of the matter is that the output of structural material in Europe has not even remained stationary, but is actually decreasing, notwithstanding the demand is constantly on the increase. As a natural consequence this state of affairs involves greater demands upon the resources of our own country, which are practically inexhaustible. So far our output of certain manufactured products is increasing somewhat in proportion to the demand, but it is not yet sufficient for both Europe and America. The building of a great vessel, such as is now wanted, requires considerable time. Few persons realize that when the mills of the old world are in full blast, manufacturing material for ship construction, and the foreign ship yards are busy, with a like condition of things existing in America, it requires at least two years to build a vessel of the type demanded for up-to-date ocean traffic. Besides the urgent demand for ships there is a large and growing business in the manufacture of machinery of immense power and capacity for the mining industries of the country. We are now doing a great deal of that sort of work, with indications of a steady continuance for several years at least. In view of existing conditions—work in hand and an abundance in prospect—we must keep in touch with the progress of events. It is our aim to meet successfully the ever-increasing demand for great mechanical constructions, and it has become necessary to make many changes and additions to our facilities."

NEW PILOTAGE BILL.

A bill will be introduced in congress in the near future providing for the abolition of the present system of piloting vessels into port by pilots licensed by the states and transferring this business to the local inspectors of steam vessels. Under the proposed bill masters of vessels in entering or leaving ports of the United States are to be allowed to navigate their vessels unaided by a pilot. This privilege has been contended for by masters and owners for many years, and bills have been presented in congress from time to time in furtherance of it. Under existing law and regulations piloting north of Chesapeake bay on the Atlantic is largely directed by local commissioners, who regulate the number of pilots and determine who shall serve as such.

Under the proposed bill any skipper who can pass the required examination before the local inspectors of the United States steamboat inspection service may act for any vessel arriving at and departing from designated ports. Masters of foreign vessels not bearing United States licenses would be obliged to take on pilots, as under the present law and custom. This movement for a change in the law regarding pilots was started by the United States Licensed Masters' and Pilots' Association of New York, to which many of the best known captains belong who make New York their hailing port. A committee of this association will be given a hearing by the interstate and foreign commerce committee, which will have the consideration of the measure. A strong fight will be made against any change in the present laws, and many of the pilots' associations have already appointed a committee to look out for their interests. The new association is said to have the support of the steamship companies.

REPORT OF ANOTHER NEW YORK CANAL BOARD.

The project of the Conners syndicate to divert a considerable portion of the lake grain trade to the Canadian St. Lawrence route seems to have stirred up New York state officials as has no other move in the transportation field in years. Unquestionably the big Montreal project has not been without influence on the canal commission appointed by the governor of New York some time ago. This board has prepared an elaborate report, and in accordance with its recommendations Governor Roosevelt will within a few days submit to the legislature plans for transforming the state canals into great inland waterways. The commission has submitted two plans. The first, or more modest, would call for an expenditure of between $20,000,000 and $23,000,000. The second, or the plan which the commission wishes to press most strenuously, would involve an outlay of $60,000,000—perhaps more. Briefly, the first plan suggests the deepening and general improving of the canals, and enlarging and otherwise improving the locks. It also involves the further utilization of the Mohawk river and the better damming and regulating of that stream, so as to provide a steadier supply of water for the main canal. This plan would accomplish about all that the friends of the canals have expected or hoped for. It would open the Erie to much larger craft, facilitate the navigation of the canal and enable boats to make the trip from Buffalo to New York very much quicker, and at the same time carry much larger cargoes. This, would, of course, increase the capacity and traffic of the canal, and thereby cheapen transportation by water, with which transportation by rail has caught up, and now threatens to pass. The carrying out of this plan would not, on the other hand, it is said, interfere with the ultimate adoption of the more ambitious and expensive plan for a great ocean waterway. For this reason it is considered more likely that the legislature will give it preference.

The second plan, that of a great waterway from the ocean to the lakes, through which sea going ships may pass, is not a new project, although up to the present time both the state and the nation have hesitated to undertake it. The federal government has considered three routes for a waterway across New York state, and either entirely or partly within the state's boundaries. One route was to be made connecting Lake Champlain with the Hudson; but the insuperable objection to this was that it would still leave the control of the highway in the hands of Canada, which was the main thing sought to be avoided. The whole idea of the waterway has been all along to make a shorter route to the Atlantic from the lakes, and one entirely within the borders of this country, thereby turning into American routes and American boats that part of the traffic of the lakes that now seeks its ocean outlet by way of the St. Lawrence. The two other routes lay within New York state, and utilized more or less the present system of canals. It is the latter idea that is followed by this commission. The course of the present canal, according to their plans, will be changed for a distance of about eighty-one miles between Syracuse and West Troy, where a practically new canal is proposed. The canal will be removed from Syracuse and Rochester and carried around those cities for the purpose of avoiding the narrow streets and the inevitable mutual interference between the traffic of the canal and the traffic of the cities. The commissioners are of the opinion that the surveys of the federal government have demonstrated the entire practicability of a great waterway through the state. The physical problem has been solved, but there yet remains the problem of finance and the problem of traffic. As to the question of raising the money for so great an enterprise, the commission leaves it to the iniative of the governor or the legislature. It makes some suggestions as to a direct tax, and also as to the payment by the counties, through which the waterway will pass, of their proportion of the cost. It is understood that Governor Roosevelt is in favor of the larger plan, and will strongly urge the adoption of the project.

PROGRESS OF THE TRIGG CO.

Plans now being made by the William R. Trigg Co. of Richmond, Va., for the enlargement of its ship yard preparatory to beginning work on the cruiser Galveston (Denver class), for which it was recently awarded a contract, demonstrate anew the special progress that has characterized the development of this southern ship yard. Less than two years ago these works were unheard of, while now more than 700 men are regularly employed, and Mr. Trigg informs the Review that the number will soon be increased to over 1,000. All the while the Trigg officials, fully supported now by the people of Richmond, are working earnestly to induce the government to take steps for the deepening of the James river. The government engineers have recommended that an appropriation of $3,500,000 be made to deepen the river to 25 feet, and there is an excellent prospect that this will be secured. Work on the torpedo boats building at Richmond is well advanced and a start has also been made on the mission boat which the company is to build for Congo river service.

It is significant that almost all of Mr. Trigg's assistants in the conduct of this ship yard are young men. Mr. James A. Nelson is a Yale graduate and until he assumed his present position was connected with the bureau of construction and repair, navy department. Francis E. Pratt, who is in charge of the hull draughting room, has been connected at one time or another with the Roach Ship Yard, the Crescent Ship Yard at Elizabethport, N. J., the Harlan & Hollingsworth Co. and the Chicago Ship Building Co. The engine draughting room is under the direction of Thomas Jardine, who came to this country from Scotland and who has seen service both with Cramps and the Newport News company. R. M. Wood, the master shipwright, was formerly with the Fore River Engine Works, and H. E. Waters, foreman pattern maker, was with the Columbian Iron Works of Baltimore.

At a recent meeting of the Buffalo Shipmasters' Association strong resolutions were passed endorsing the bill recently introduced in the house of representatives providing for the reorganization of the weather bureau upon plans submitted by Chief Willis F. Moore. In the resolutions the members of congress from the Buffalo district are urged to give the measure their unqualified support.

STORY OF THE CHARLESTON DISASTER.

In official reports from Manila relative to the loss of the United States cruiser Charleston off Camiguin, the accident is said to have been due primarily to the inaccuracy of the Spanish charts. It is claimed that Spanish charts of the Philippine waters are full of inaccuracies and are not to be trusted. In heading for the island of Camiguin, the navigators on the Charleston were governed by a chart which showed two small pinnacle rocks sticking straight out of the water about eighteen miles from the island to the northeast. The chart showed these pinnacles as about 6 miles apart with clear water between them. As the Charleston approached this vicinity she was steaming a little less than 5 knots an hour and there was a current setting her along at 4 knots. As the cruiser approached the pinnacles, those on board noticed confused water ahead of them. This was supposed to be a tide rip of which the sailing directions spoke, and Captain Pigman gave the navigator the order "port your helm. It is easier to go around a tide rip than it is over a reef." The helm was put over hard immediately, but the fact that the vessel was running at a slow rate of speed prevented a response as quickly as would otherwise have been possible. Indeed it has been stated by officers who were on board that the disaster might have been averted had the vessel been running at a greater speed. The Charleston, as she swung off to starboard was borne down on the rocks, located at the supposed tide rip. The commander, anticipating what was coming, gave the order to reverse the engines at full speed and this was done instantly, but time was not allowed for the cruiser to gather sternway and she struck heavily on the port bow, gave a sharp list to port, scraped along, bumping over the jagged rocks, and stopped held fast by the reef. The engines were kept in operation at full power and did all they could to back the vessel off, but so far as fore-and-aft movement was concerned she never budged.

The discipline on board when the vessel struck is said to have been perfect. The men were at work closing the watertight doors before Chief Engineer Little, who had been asleep, could get to the engine room, and they shut them so quickly that one man was shut up in the hydraulic room. It was realized almost from the first that the vessel would have to be abandoned. The vessel pounded in a frightful manner, the swell lifting her and dropping her repeatedly with great force on the jagged rocks. The boilers were lifted from their fittings and all but cast adrift. There was no delay in coupling up the pumps and setting them going; but all the pumps, first the 6-inch and later the 12-inch, were hopelessly clogged by the coal which had been washed down into the bilges. The rush of incoming water finally reached the forward fire rooms and the hands of the steam gauges slid down to the left with a rapidity which soon made it necessary to abandon the big pumps for want of steam. The steam ran down to 30 pounds and then the air pumps stopped, while a dimming of the electric lights indicated plainly to all on board that water had reached the dynamo room. Even then the engine room force stuck to their work, vainly striving to operate some of the pumps by hand and with the light of oil lamps. The men on the Charleston were all taken off safely, although the fact that the vessel had lost one of her boats made the work difficult. After the shipwrecked crew had been rescued by the Helena, a steam launch made another trip to the Charleston, but it was found to be impossible to get aboard. The cruiser had settled by the stern until the after bridge was awash, and it was evident that it was simply a question of a little rough weather when she would go down. The general opinion is that the court of inquiry will find that no blame attaches to the Charleston's officers for her loss.

CHANGE IN NAVAL BUREAUS.

The proposition of Secretary Long of the navy to consolidate the bureaus of steam engineering, construction and repair, and equipment, is a topic of special interest in naval circles. Advocates of the change insist that it is proposed in the interest of economy and good business administration. The new bureau, if established, will be entitled the bureau of ships and will have two divisions, one of construction and the other of steam engineering, presided over by a naval constructor and a line officer skilled in engineering duties, respectively. In charge of the bureau will be a line officer or naval constructor as the president may elect. It is claimed that in proposing this change Secretary Long is simply conforming to the views entertained by his predecessors. The navy department was originally organized in 1798 with a secretary and a force of clerks, and thus matters continued until 1815 when there was established a board of navy commissioners, consisting of three officers holding the rank of captain. These commissioners were required to assist the secretary, paying especial attention to the construction, equipment and navigation of vessels. In 1842 the present bureau system was adopted, but as there were practically no steam vessels in existence at that time, no provision was made for a bureau of steam engineering. Gradually the bureaus grew in number. Secretary Whitney, during his tenure of office, recommended a reduction of the bureaus to five on very much the same plan as that now proposed by Secretary Long. At that time the proposition was for the abolition of the bureaus of steam engineering and equipment and their consolidation with the bureau of construction and repair under the name bureau of material, construction and repair. This was to contain two divisions, one of construction and equipment and the other of steam engineering. Representative Boutelle of Maine, now chairman of the naval affairs committee, vigorously opposed the Whitney proposition.

ELEMENTARY NAVAL TACTICS.

The little volume entitled "Elementary Naval Tactics" by Commander Bainbridge-Hoff, U. S. N., recently from the press, will doubtless have a wide and appreciative circle of readers as indeed it deserves to have. The book opens with a definition of the general scope of naval tactics and this is followed by chapters on the ship in action, the organization and command of a fleet, the fleet under drill and the fleet in action on the open sea. The whole presentation of the subject is clear and forceful and will appeal with especial force to the younger class of naval students. The book is elaborately illustrated with drawings and diagrams. Published by John Wiley & Sons, 53 East Tenth street, New York city.

AROUND THE GREAT LAKES.

S. H. Crowl, attorney at law and proctor in admiralty, has changed his offices in Cleveland to the American Trust building.

Hall & Root, vessel agents of Buffalo, are now located in new quarters—rooms 21 and 22 Exchange building, No. 202 Main street.

The Great Lakes Towing Co. will pay its first dividend on preferred stock next month. It has been decided to pay 1¾ per cent. quarterly, beginning in February.

General Manager S. T. Crapo of the Flint & Pere Marquette Ry Co. announces the appointment of W. L. Mercereau of Ludington as superintendent of steamships for that company.

No contracts for moving coal to Lake Michigan ports next season have been closed as yet, although more than a million tons has been covered for the head of Lake Superior, as already announced, at 50 cents a ton. It is understood that Lake Michigan shippers are offering 60 cents to Manitowoc and Sheboygan.

A very capable officer in the light-house service, Commander Duncan Kennedy, inspector of the eleventh district with headquarters at Detroit, has been ordered to sea duty. He takes command of the cruiser Detroit, now at Key West. Commander Kennedy will be succeeded by Lieut. Commander J. C. Wilson, former executive officer of the Indiana.

The new officers of the Buffalo lodge of the Shipmasters' association are: President, Edward C. Maytham; first vice president, Jeremiah Coleman; second vice president, Albert Robinson; secretary, John Perew; treasurer, Lyman Hunt. Capt. Edward C. Maytham was chosen as delegate to the grand lodge meeting, which will be held at Buffalo, Jan. 30, and Capt. Martin Niland was elected alternate.

J. C. Gilchrist of Cleveland a few days ago purchased from B. L. Pennington and others, also of Cleveland, the wooden steamer C. B. Lockwood. Mr. Pennington is no longer interested in vessel property, having sold, a short time ago, other vessels which he controlled. The Lake Erie Transportation Co. (Mack interest) of Cleveland, has purchased the wooden steamer Athens from Capt. James Davidson of West Bay City.

Mr. H. W. Hart of Green Bay, Wis., (Hart's Steamboat Line), announces that the steamer C. W. Moore is for sale. The Moore is 125 by 25 by 9 feet and is in very good condition. As a steam barge she would carry 265,000 feet of lumber. Capt. D. H. Lahey a few days ago bought the Hart steamer Welcome and will make a steam barge of her.

Milwaukee has in winter quarters seventy-six vessels that are adapted to carry grain. Sixty-three of them are steam vessels and thirteen sail vessels. Capacity in bushels of corn is: Steam vessels, 5,775,000; sail vessels, 1,192,000; total 6,967,000. This information is taken from a card issued by David Vance & Co. of Milwaukee, and which gives names and capacities of the different vessels.

Numerous changes are being made in the offices of vessel men and ore shippers who occupy practically all of the Perry-Payne building, Cleveland. In the shifting around that is now going on, M. A. Hanna & Co. will be given the entire sixth floor; the Carnegie Steel Co., Ltd., (branch offices), will take up the greater part of the seventh floor, and on the fifth floor the Pittsburg Coal Co. (sixty-million-dollar consolidation) will have for its branch offices in Cleveland some eight or ten rooms.

It is understood that the engineers having charge of the construction of vessels at the different works of the American Ship Building Co. are agreed that certain changes in the rules of the steamboat inspection service regarding the construction of vessels could be made to advantage and without loss in structural qualities of the boilers. Mr. Frank E. Kirby of Detroit, and other representatives of the consolidated ship yards will visit Washington in a few days to go into this subject with officials of the inspection service.

Buffalo grain shovelers have finally decided that instead of submitting only one name to the Lake Carriers for the grain shoveling contract they will submit eight names—A. J. Elias, Charles Lamy, Reuben J. Getz, James P. Sweeney, George Phillips, Michael Davis, Thomas Cunningham and John Hagan. In dealing with the vessel interests at the Detroit convention next week the shovelers will be represented by P. J. McMahon, president of the Buffalo union, Daniel J. Keefe of Chicago, president of the International Longshoremen's Association, and Rowland B. Mahany, ex-member of commerce and counsel for the scoopers.

C. E. Robertson, engineer in charge of the remodeling of the Knapp roller boat at Prescott, Ont., announces that the placing of the paddles has been completed. It required the drilling of 140,000 holes and the use of 70,000 rivets to do the work. The changes and improvements of the interior of the boat are well under way.

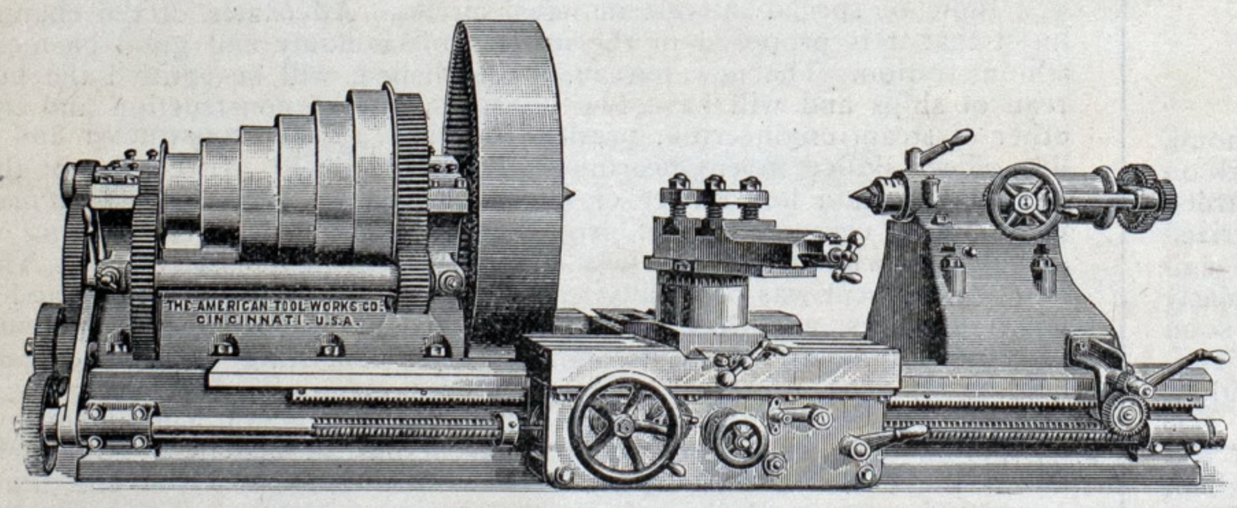
Wallace Bros. of Detroit, Mich., announce in an advertisement elsewhere in this issue that they have at Chicago a special bargain to offer in a steam derrick, clam, lighters and sand pumps.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of Jan. 10. 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	47½	48	46	47½
American Steel & Wire, Pfd.....	90¼	90¼	89⅝	90
Federal Steel	51½	51½	48½	50
Federal Steel, Pfd.....	72	72	70⅝	71¾
National Steel	41¾	41¾	41	41
National Steel, Pfd.....	92½	.....	.....	92½
American Tin Plate	30	30	29	29½
American Tin Plate, Pfd.....	81	.....	.....	81
American Steel Hoop.....	42¼	42¼	42¼	42¼
American Steel Hoop, Pfd.....	.....	.....	.....	.....
Republic Iron & Steel	21	21½	20¼	20¼
Republic Iron & Steel, Pfd	.....	.....	.....	.....

Swing Standard Engine Lathes-52-inch and 60-inch.



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BOSTON STORE: 36 Federal Street.
BALTIMORE: The Fairbanks Co.

SAN FRANCISCO: Henshaw, Bulkley & Co.
DENVER AND SALT LAKE CITY: The Mine & Smelter Supply Co.
LONDON: Alfred Herbert, Ltd., 7 Leonard St., Finsbury, E. C.
DUSSELDORF: de Fries & Co., Act. Ges., Graf Adolf Strasse, 83-87.

ANTWERP: Nyssens Fréres, 33 Rue des Peignes.
BERLIN: de Fries & Co., Act. Ges., Kloster Strasse, 13-15.
PARIS: Roux Fréres & Cie., 54 Boulevard du Temple.
MOSCOW: Alfred Stucken.

It is well enough, as proposed by the war department, to station watchmen at the St. Clair Flats canal, so as to prevent, if possible, a repetition in that waterway of the blockades that have occurred in the St. Mary's river during the past season, but what is really wanted is a second canal at the flats. A blockade in this narrow entrance to Lake St. Clair would prove far worse than either of the Sault river disasters. It would practically stop everything afloat on the lakes. It certainly seems strange that the vessel interests are not making a determined effort to secure the construction of a second St. Clair canal and that at once, especially in view of the moderate expense (compared with the great interests involved) at which the work could be done. But the gravity of the situation will probably not be realized until a vessel is sunk in the present narrow canal.

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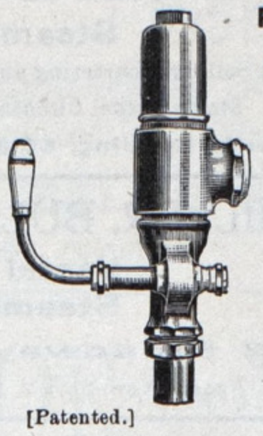

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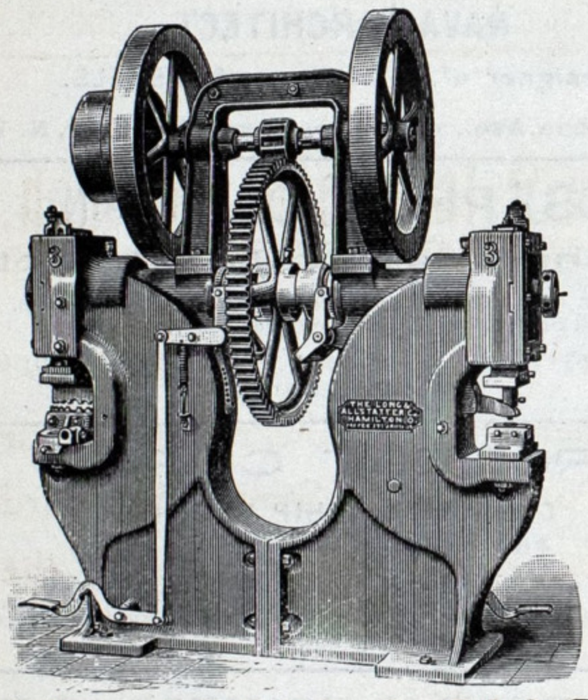

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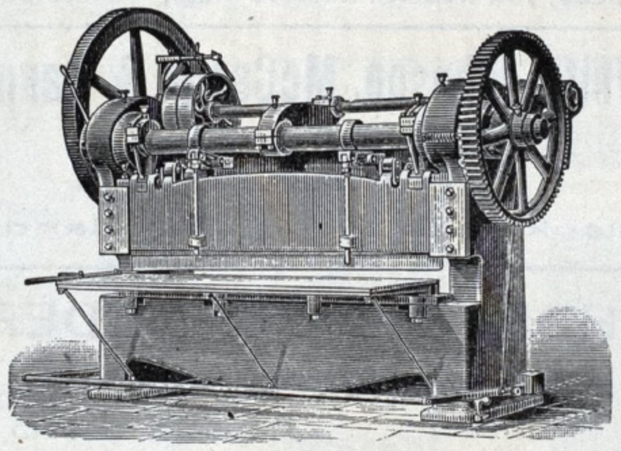

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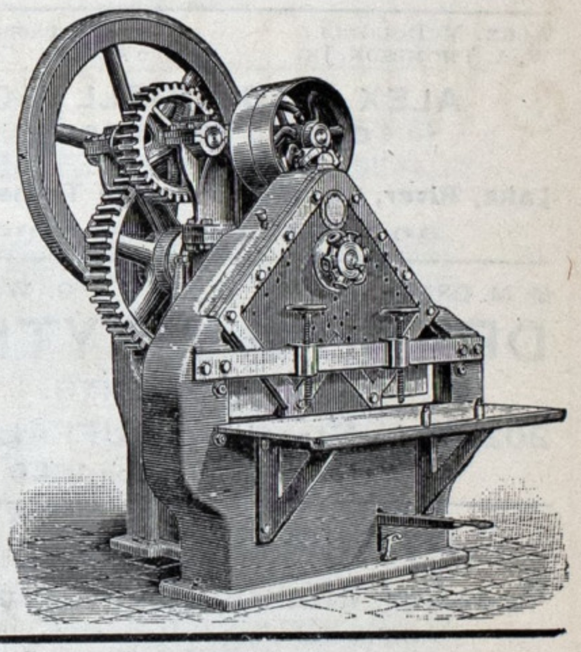

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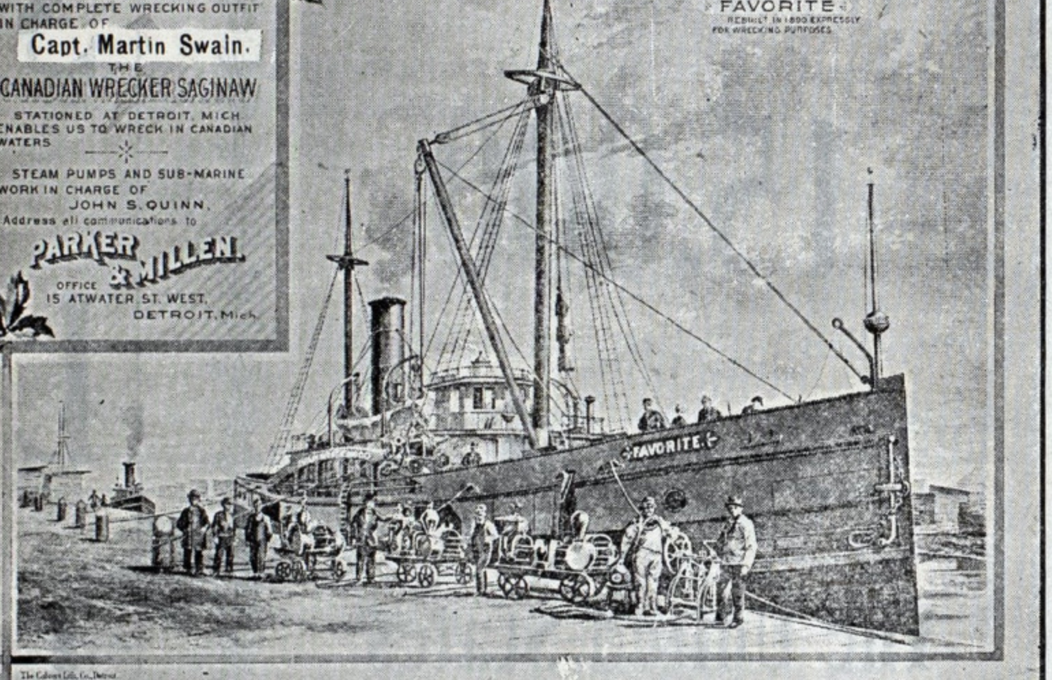

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...	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
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10-100 TON JACKS.
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1-10 ..
1-9 ..

Telegraph

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TELEGRAPH
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Office of Engineer, Tenth Light-house District, Buffalo, N. Y., Jan. 10, 1900. Proposals will be received at this office until 12 o'clock noon of Feb. 10, 1900, for constructing store houses, sheds, etc., including preparation of site at the Buffalo Light-house Depot, N. Y. Thomas W. Symons, Major, Corps of Engineers, U. S. A., Engineer Tenth Light-house District. Jan. 17.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., December 20, 1899. Sealed proposals for Pier Extension at Muskegon, Mich., will be received here until 3 p. m., January 19, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs.
Jan. 11.

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U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., January 2, 1900. Sealed proposals for Extension and Repair of Pier at South Haven, Mich., will be received here until 3 p. m., February 1, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs.
Jan. 25.

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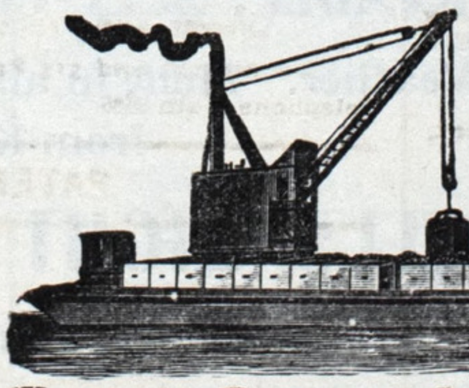

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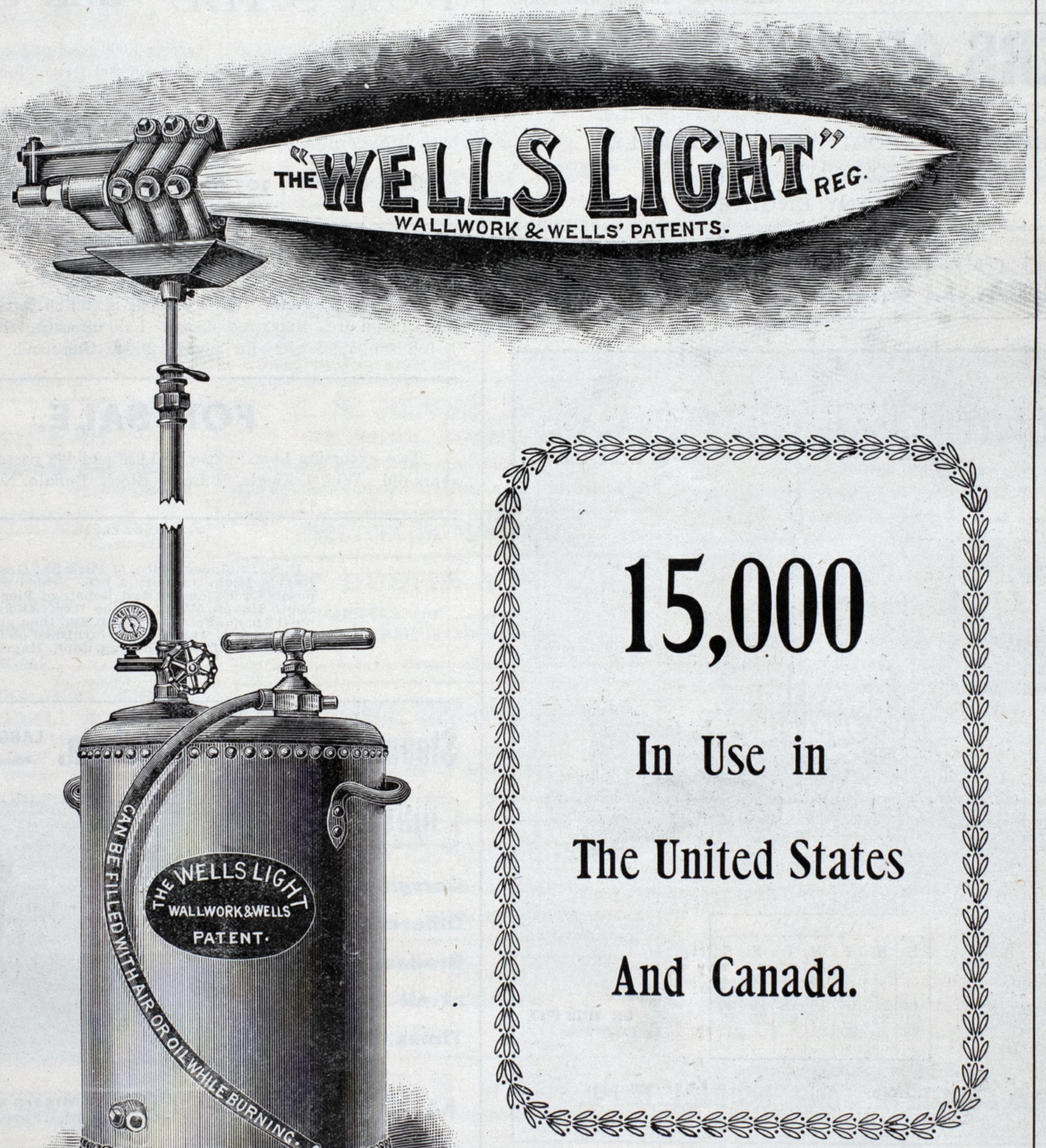
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